# The Builder.

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## ILLUSTRATIONS.

Sculpture Panel, Central Library, Bristol.....Mr. Charles Pibworth, Sculptor.
Doorway in Chapel, Pisa Cathedral.....Drawn by Mr. Lionel U. Grace.
City of Rochester Technical Institute.....Messrs. Russell & Cooper, Architects.
Premiated Design, Herne Hill Public Library.....By Mr. T. Wallis.
Mexborough House, Dover-street.....Mr. J. S. Gibson, F.R.I.B.A., Architect.

*Illustrations in Text.*


Technical Institute, Rochester. Plans..... Page 67
Premiated Design for Public Library, Herne Hill Page 68
Mexborough House, Dover-street. Plans ..... Page 69


## CONTENTS.


| | PAGE |
|---|---|
| The Arts and Crafts Exhibition | 57 |
| Technical Schools and the Co-operation of Employers | 59 |
| Notes | 60 |
| Royal Academy Lectures | 62 |
| The Surveyors' Institution | 63 |
| Architectural Societies | 66 |
| Fifty Years Ago | 67 |
| Prize Drawings by Students of the Institute | 68 |
| Illustrations :— | |
| Sculpture, Central Library, Bristol | 68 |
| Doorway, S. Reniéri Chapel, Pisa Cathedral | 68 |
| Illustrations (*contd.*) :— | |
| Rochester Technical Institute | 68 |
| Premiated Design for Public Library, Herne Hill | 68 |
| Mexborough House, Dover-street | 68 |
| The Quantity Surveyors' Association | 69 |
| Competitions | 70 |
| Books Received | 71 |
| Correspondence :— | |
| Royal Academy Lectures | 71 |
| Appointment of District Surveyors | 71 |
| Indexes or Indices? | 71 |
| The Student's Column | 71 |
| Obituary | 72 |
| General Building News | 72 |
| Miscellaneous | 73 |
| Legal :— | |
| Dispute as to a Building Estate | 73 |
| Converting a Building | 73 |
| Patents | 73 |
| Some Recent Sales | 74 |
| Meetings | 74 |
| Prices Current | 74 |
| Tenders | 75 |
| List of Contracts, etc. | 76 |


### *The Arts and Crafts Exhibition.*

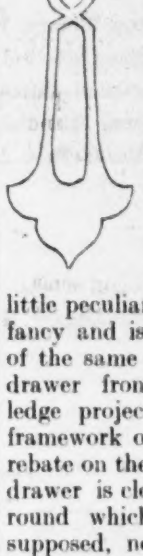
IT is a pleasure to be able to say that the eighth exhibition of the Arts and Crafts Exhibition Society, at the Grafton Gallery, is the best they have ever held, in one respect at all events—that it is an exhibition almost entirely free from eccentricities. "L'Art Nouveau" is conspicuous by its absence; there are none of those freaks of design which were the result of a kind of struggle after what is supposed to be originality, and which became a source of not unmerited derision to the Philistine critic. The rooms are full of work nearly all of which is interesting, and much of it beautiful. There may have been in some former exhibitions individual exhibits which were superior in their kind to anything in the present collection; but there is at any rate nothing of any importance to object to. And, partly owing to the larger extent of the Grafton Gallery, the exhibition is better and more effectively arranged than it ever was in the New Gallery; things are not crowded together so much, and there is room to see the total effect. The large gallery, in which are hung most of the exhibits which approach the pictorial side of applied art—designs for stained glass and various forms of mural decoration—is decorated at the top by the continuous frieze designed by Mr. Walter Crane for the British section of the St. Louis Exhibition; a very graceful design in which groups of conventional foliage are arranged with symmetrical spacing, leaving a considerable amount of white ground between, the whole being very bright and decorative. At the end of the room a kind of semi-architectural screen is formed by Mr. Dressler's large plaster model for the stone carving for the Victoria Infirmary at Newcastle, the main portion of which consists of life-size spandrel figures in bas-relief on either side of a large doorway opening, the whole thing extending across a great part of the width of the room. The figures, whose hands meet in the centre over the arch, symbolise respectively "Hygiene" and "A Crown of Wild Olive." As we shall not return to this again, we may say that while the figures have the spirit and vigour of style which we are accustomed to associate with Mr. Dressler's work, it seems to us that in a decorative sense the effort to make them accommodate themselves to and fill up the space of the spandrel has not been quite happily managed, the two figures being, as one may say, bent at the waist in a manner which, considering them as figures and apart from the setting, is a little awkward and unpleasing in line, and conveys too much the appearance of an effort to make them fill the space. A figure designed to fill a special space ought to have the appearance of having naturally fallen into the attitude necessary for that object, while these figures appear a little forced in their attitude and do not produce an agreeable line.

The main object of the Arts and Crafts Society is set forth by its president, Mr. Walter Crane, in what he calls a "foreword" (an affectation of phraseology, since "preface" is an old and legitimised English word now) as being "a search for increased beauty, refinement, and sincerity in design and workmanship in the accessories of human life, united by an architectonic ideal; and as affording scope, in what may be considered the useful arts, for the artistic expression of individual taste and character in contradistinction and protest against purely commercial, mechanical, and machine production" (there seems a suspicion of tautology in the closing sentence). This definition of the objects of the society should in fairness be kept in mind in judging of the contents of the exhibition, because it will be seen that the main object is to give character and beauty to common objects, as implied by the expression "useful arts," rather than to foster the production of objects of great costliness and elaboration, such as are defined by the adopted French term *objets de luxe*. While we have the greatest possible sympathy with this aim of giving beauty and interest to common things, and admit that it has the wider application, since the number of those who can afford the most costly work is comparatively limited, we cannot help wishing that there were a little more recognition of the *objet de luxe*, which may have its worse or its better taste just as much as the plainer and cheaper object. As we remarked the other day in reference to some French work of the Louis Quinze period, with all its exquisite and costly finish there is a want of soul in it; but

this defect is not necessarily inherent in costly work. On the contrary, provided the artistic spirit in design is present, the more costly and the more finely elaborated is a work of construction, such as a table or a sofa, the more beautiful and valuable it is; there is nothing vulgar in itself in costliness; what is vulgar is costliness without art. The Arts and Crafts Society might perhaps be fulfilling its mission even more fully if it were to encourage a little more the production of furniture of the class which would suit a palace, but with more of the true artistic spirit than is generally found in palatial furniture. As it is, there is a little too much of the feeling that plainness and simplicity are essential qualities in artistic work. They are not necessarily so. The truth runs only so far as this; that simplicity with artistic character is worth more than costliness without it. The impression given by the general character of the objects of use exhibited, on this as on former occasions, is that art is something for the middle and lower class rather than for the prince or the millionaire. Of the two possible alternatives it is perhaps the more wholesome and certainly the more generally useful. Still, why leave the prince and the millionaire out in the cold? They also have, artistically, souls to be saved; they want teaching that man doth not live by money alone. There is a socialistic feeling at the bottom of all this, also wholesome, but—just a little one-sided.

In regard to the influence which these exhibitions have had, however, more we believe might be claimed for the Arts and Crafts Society than the president claims in his preface—we beg pardon, "foreword." In referring to the steady growth and development of the movement, he remarks that "arts and crafts exhibitions have become common throughout our country, and handicraft classes have now generally become a necessary part of any art-school curriculum." He might have gone further than "our country." We have had evidence that the Arts and Crafts exhibitions in England have had a very considerable effect on the Continent, in Germany especially; that exhibitions have been started there on the same lines; and the fact of their connexion with English influence was plainly shown in the remark reported to us the other day of a German shopkeeper, who, in endeavouring to explain to an English customer what sort of building it was that he was showing a photograph of, said "It is a kind of Walter Crane Museum." That is a reputation at any rate; and it is one well earned.

We shall, of course, devote more than one article to the varied contents of the exhibition; but we naturally turn first to furniture, which is in itself a kind of architecture on a smaller scale, governed by the same principles; sound construction to begin with, and decoration based upon and expressing construction. The most noteworthy exhibit in this class is perhaps the "Inlaid Mahogany Sideboard" in the middle gallery, designed by Mr. George Jack, executed by Messrs. Thatcher, Gauntlett, & Millard, and exhibited by Messrs. Morris & Co. This is a truly fine and sumptuous work, noticeable for the harmony of line shown in the bold, sweeping curve of the front, the bold decorative lines of the inlay, and the monumental effect of the square pedestal cupboard beneath, flanked by shelves which echo the curved line of the main front; even the very simple perforated ornament which is carried round the whole has its value. The octagonal angle shafts are carried up a considerable height above the shelf of the sideboard and expand into circular candle-brackets (for as such they must be regarded, if they are anything), according to a fashion which has obtained lately; this furnishes, no doubt, an effective finish to the shafts, but it is hardly a good practical position for candles or any object which would suffer from being overturned, and as a whole the sideboard would have been better for the omission of these features. The price is not appended to this, as it is to many of the pieces of furniture; it would be interesting to know for what sum it could be carried out. Another piece of furniture which claims special mention is Mr. Sidney H. Barnsley's "Library Table in English Walnut" at one end of the large gallery; a simple but excellent piece of work, in which the supports near each end, which carry small drawers between, have that appearance of steadiness and solidity which is so desirable in a library table. A little very simple inlay decoration is applied to emphasise the principal lines of the design. Having mentioned these two rather prominent objects, we may take some of the rest in order of position. In the octagon-room a small oak table with folding legs, by Mr. Pyment, is good in construction and as a very simple design. Mr. Lethaby's "Writing Table" suggests the question whether it is an altogether suitable disposition of ornament (wood inlay) to concentrate it on the legs, leaving all the rest nearly plain; unless indeed it is assumed that the table would be covered by a cloth and only the legs seen; in that case there is reason in it. The "Mahogany Cupboard" by Mr. Minihane is a highly finished piece of work, but the angle shafts and the framing are rather too much cut up with carved ornament which gives them rather a fidgety look and which is hardly interesting in itself. Mr. Bultitude's "Mahogany Escritoire" is well constructed and put together, and a good surface effect is obtained by the simple expedient of veneering with lozenge-shaped pieces fitted together with the grain reversed. Mr. Gimson's "Sideboard in Elm" is one of the best things in this room; there is a great deal of character in it, with excellent finish; it is absolutely destitute of mouldings, the edges finishing square—we do not say this is necessarily a virtue, but the whole thing is in keeping. In this and in two or three other examples in the exhibition we notice a method of marking and defining the outline of the drawers and doors by a narrow slip (about ⅛ in.) of dark wood let in and projecting a little above the general plane, rounded on the top; the effect of this is simple, neat, and permanent. But in this and other examples we notice a tendency to a rather too small and trivial treatment of the loose metal handles, which in this example are flat and hang so close to the woodwork as to be not convenient to get hold of. In two or three other exhibits, by different exhibitors, there is a form of brass hanging handle something like this, which is certainly not very artistic in character and is uncomfortable for the hand and bad to grasp; it looks more like a kind of thing to be bought by the gross in a shop than a fitting appendage to furniture designed for an art exhibition. In Mr. Barnsley's "Library Cabinet" we notice another little peculiarity which seems to be a new fancy and is met with in other exhibits of the same class; the treatment of the drawer fronts with a small moulded ledge projecting all round beyond the framework of the drawer and forming a rebate on the inner side, so that when the drawer is closed there is a projection all round which covers the joint and is supposed, no doubt, to keep out dust. We rather doubt its doing so; dust is a very insinuating element; and the result is that when the drawers are closed they present the appearance of a series of raised panels, and the effect is not very good. Among some of the metal articles in this room there is a want of the stability of base which is necessary for an article which is to stand loose on the floor; this is the case with Mr. E. Spencer's "Lectern in Wrought Iron," which is much too unsteady on its base for a lectern; and to some extent, though not so much, the same objection applies to Mr. R. Evans's "Floor Standard for Electric Light," which however, with its white silk lamp shades, looks very well as a whole. A "Font of Cast Lead" by Mr. G. P. Bankart is a revival of an ancient type of work, and a good design in itself; but lead is a somewhat grim material for a font bowl, justified only on archæological grounds, and moreover ornament in relief in the interior of the bowl is out of place; what is wanted there is merely a smooth bowl to hold water. This is or should be a general principle in all things made to hold liquid: the most decoratively treated mediæval chalices are nearly always smooth inside. Mr. Bainbridge Reynolds's "Lectern in Brass and Leather," which stands in the centre of the room, has the merit of mass and solidity, but is not otherwise very interesting. Mr. Gimson's "Wrought Iron Firedogs," which we seem to have seen before, are beautiful pieces of decorative design in this material.



In the middle gallery we are first greeted by a "Stone Sundial" by Mr. H. W. Palliser, curiously planned in the form of a concave quatrefoil, with heads of monsters forming brackets under the projecting arms; an original but not very seductive work. Neither can we feel much pleased with Mr. Ashbee's "Writing Cabinet with Tooled Leather" next to it; the expanse of dull red leather has a heavy effect. Mr. Gimson's "Corner China Cabinet in English Oak," with its simple embroidery of inlay on the bars, is a nice bit of work, but for the cottage or kitchen rather than the drawing-room. A "Chair," "designed by a guild of four designers," seems rather a small matter

to have occupied the resources of four designers; but it has original character. Mr. Bultitude's "Writing Cabinet," with no very marked character, has qualities of gracefulness and good finish. A "Writing Cabinet" by Mr. Gimson, with the same flat character and absence of mouldings as his exhibit in the octagon room, is, like that, a good piece of work, but one of those that are rather spoiled by the commonplace hanging handles already referred to. Then we come to a more important work, an "Inlaid Sideboard" by Mr. Lethaby, with an elaborate inlay of conventional floral forms on the front of the drawers, and which is distinguished by having sensible and workmanlike brass handles, convenient to the hand and agreeable at the same time in design. Whether the inlaid round spots on the legs of this piece of furniture are any improvement to its appearance may be questioned. Among the objects arranged on it are an excellently designed metal tea-set by Mr. Benson, almost devoid of ornament, producing its effect solely by fine line; and two charming earthenware bowls of Mr. Lethaby's design, made by Messrs. Wedgwood & Sons. Mr. G. Ll. Morris's "Clothes Press in Mahogany" is a refined and highly-finished piece of plain work, a little spoiled by the four square blue stones placed rhomboid-wise in the middle of the circular panels; they seem to have no relation whatever to the rest of the design. Two oak chairs designed by Mr. Dalton point the moral that it is a mistake to be too architectural in furniture forms; the columns and arcades which adorn each are not wooden forms, and are out of place. The "Oak Wardrobe" by Mr. G. Ogilvie rather suggests the idea of being formed on Louis Quinze lines with the ornament left out; it is not a bad-looking thing, but the two semicircular gablets which crown it are rather a deception, having nothing behind them, and look better in front than when seen edgeways. Mr. Ashbee's "Oak Armchair with Inlay" is a good piece of plain but characteristic wooden structure, contrasting in this sense with the architecturally decorated chairs before referred to. Mr. Penty's "Dresser" and "Cabinet of Drawers," both very plain work, would have been a good deal better for the omission of the commonplace and not very well cut ornament which runs along their top edges, and which was not worth doing at all if it were not done better than that. On the dresser are some delicate and charming painted China plates designed by Mr. A. Powell, and made by Messrs. Wedgwood. Mr. Lethaby's "Painted Dresser" is a curious piece of work; a plain unmoulded erection with square thick legs, entirely painted over with conventional foliage in predominating green tones, the whole of the table top even being covered with a small-scale conventional scroll work in green, not quite so well designed as it might be—there are some bad broken-backed curves in it. It is certainly something new, and looks attractive at present, though we should think its style much better suited for a bedroom washstand than for a dresser in the usual sense of the word; the drawback is that with any kind of daily usage the painted ornament would soon become more or less rubbed and defaced, and it would then look a rather unhappy object. Mr. F. C. Eden's "Ebony Cabinet" repeats the device before mentioned in another cabinet front, of the semicircular gablet finish at the top; but in this case the semicircular section is carried to the back of the cabinet, and thus the shape of the front really represents the construction.

On another occasion we will consider some of the more purely decorative and less constructional work exhibited.

## TECHNICAL SCHOOLS AND THE CO-OPERATION OF EMPLOYERS.

ONE of the main difficulties in regard to technical education is the problem of education and employment; in other words, how to enable a young man to combine education with breadwinning, or, at any rate, with the means of breadwinning at a comparatively early age. We have all heard how in the Scotch Universities the sons of farmers would study there for one period of the year, and work on the parental land for another, and how American students have been found as waiters in a restaurant during a large part of the year. These are primitive methods; but the stories, true or not, indicate a very practical difficulty, which, if it can be overcome, will assist greatly in the satisfactory technical education of those who are to spend their lives in the engineering and kindred professions. It is because it exhibits the union of practical technical work with theoretical technical education that a small publication now being issued by the Association of Technical Institutions is so valuable.* The result of the inquiry held by this association appears to show that it is quite possible for young men to obtain precept and practice contemporaneously, provided that employers will go a little out of the ordinary groove to enable technical students to be workers in the shop.

But it is clear that without the goodwill and the co-operation of employers this desirable union of theory and practice is impossible, and those employers and firms who are pioneers in the new movement are, we have no doubt, acting in an enlightened manner and on sound lines.

The Report of the Institution states that the trades to which the scheme of co-operation applies are chiefly those connected with engineering, or to some extent with building. It will be useful to give some examples of the manner of co-operation. At Leicester, for instance, apprentices in the building trade are sent for one afternoon a week by employers to the technical school in that town, and apprentices to house painters for one full day a week during the months of November, December, January and February. Here we have co-operation in a slight and rudimentary state. If we go north to Glasgow, we find a very different state of things, which has resulted in the employment of Glasgow engineers all over the world. "The 'sandwich' scheme for the training of engineering day students has been in operation for many years, and the whole curriculum of day classes for engineers is based on the assumption that in the case of nearly all students the winter session of twenty-five 'teaching weeks' will be followed by service in works during summer. Hitherto the students have been able to gain admission to works during the summer without difficulty, although no formal arrangement has existed between the college and employers." Here we have co-operation on a broad and simple plan, and it is on the basis of this plan that the difficulties of the problem may, at any rate, be partially solved.

A modified but apparently satisfactory plan is that to be seen in connexion with the Barrow-in-Furness Technical School. In this town are the works of the famous firm of Vickers, Sons, & Maxim, Ltd., 720 of whose apprentices attend the technical school. This is what the Report says of the interesting state of co-operation between this great firm and this school. It appears to show plainly that this question of co-operation has passed out of the experimental stage:—

"All apprentice lads are advised to become students at the local technical classes, and, providing satisfactory evidence is given that attendance of not less than two nights per week has been carried out through the session, such apprentices may, as vacancies arise, compete for entry into the drawing offices.

During the session apprentices attending recognised technical classes will be allowed to commence work at 7 a.m., in place of 6 a.m., on the morning following a class attendance, up to but not in excess of three per week. The principal of the technical classes will make a return of attendance, and any violation of this counts as lost time.

A course of classes extending over four years is suggested, and in order to encourage attendance at the classes the firm is prepared to make increased allowances to apprentices for successes in these or allied technical subjects, provided that they have attended the classes regularly so as to obtain the parliamentary grant, on the following scale:—

| | 2nd class. Per week | 1st class. Per week |
|---|---|---|
| Extra pay for each subject passed in 1st year's course ..... | 3d. to | 6d. |
| Extra pay for each subject passed in 2nd year's course ..... | 3d. to | 6d. |
| Extra pay for each subject passed in 3rd year's course ..... | 3d. to | 6d. |
| Extra pay for each subject passed in 4th year's course ..... | 3d. to | 6d. |

The total number of subjects for which payment is claimed is not to exceed four for any one year.

Apprentices who furnish satisfactory evidence that they have pursued a course of study during the term of their apprenticeship may receive permission to attend a technical college, the time spent at college counting towards the completion of their apprenticeship, on condition that at the close of the college course the apprentice will, if required, agree to serve the firm for a period equivalent to that of the college course, the rate of pay being determined by the value assessed for the service, but being in no case less than:—

For any period under 21 years of age, 20s. per week.
For any period under 22 years of age, 25s. per week.
For any period over 22 years of age, 30s. per week.

The firm undertakes to give such apprentices employment during college vacation at rates of pay corresponding to their year of service, counting such as continuous.

The firm is desirous of giving encouragement to apprentices to attend at a technical college, and points out that facilities exist by which prizes or scholarships may be earned, enabling the student to follow such a course without heavy financial strain on his resources.

The firm will at all times be prepared to favourably consider any modification in the above scheme that will be of assistance in bringing about this result; and, further, that so far as particular conditions appertaining thereto will permit, preference will be given to lads possessing technical training in making appointments of trust in the works. This must not, however, be taken to act to the exclusion of any person who is, in the opinion of the firm, fitted for promotion."

* "Report of an Enquiry as to the Co-operation of Employers and Technical Institutions." Issued by the Association, December, 1905. (London: St. Bride's Press, Ltd., New-street-hill, Shoe-lane, E.C.)

If so satisfactory a state of things is found at Barrow-in-Furness, it is clear that, allowing for the different circumstances of other trades and other places, this plan of co-operation is capable of extension all over England. At present but an infinitesimal number of employers interest themselves in the technical instruction of their workers. But the useful Report which is before us shows that an intelligent and enterprising, if small, minority in different parts of England is awake to the necessity of improving the technical education of the country by means of educational and business co-operation. It may be, in the words of the Report, that "the question of the co-operation of employers is the question of the hour in technical instruction"; it is certain, at any rate, that it is a question of vital importance. We hope, therefore, that this Report will be carefully studied by employers all over the country, for, after all, it is primarily their interest to have workers as well educated in technical matters as possible, and when employers and technical institutions generally co-operate for the same end one great educational problem will be nearly solved.

## NOTES.

**Vendor and Purchaser of House Property.**

VENDORS and purchasers of house property should note the case of Carlish *v.* Salt. The action was brought by the purchaser to recover the deposit and the expenses he had incurred in investigating the title. The premises were freehold, but were in a tumbledown condition, and were shortly likely to be rebuilt. The contract for sale was an open contract and was entered into on October 12, 1904. On November 12th, 1903, a party wall notice under the London Building Act had been served upon the vendor, and on October 10, 1904, the usual award had been made rendering the owners liable to pay a certain portion of the costs of rebuilding the party wall. The purchaser was not informed of this liability when he entered into the contract, and when it came to his notice he claimed compensation, and the vendors subsequently treated the contract as abandoned, retaining the deposit. The Court held that the party wall notice and the award constituted a material fact in the knowledge of the vendor which the purchaser could not be expected to discover for himself, and as such amounted to a latent defect in the title; and the plaintiff recovered his deposit as well as the expenses incurred in investigating the title and the costs of the action. This case has a very important bearing upon the sale of property. As we have frequently shown, liabilities may attach to house property, as, for instance, for street improvement, some time before payment is required; such liabilities cannot be discovered by an examination of the title, however careful, and a purchaser, unless he is informed, may find himself saddled with wholly unexpected liabilities.

**By-laws and Dust Removal.**

THE case of Wandsworth Borough Council *v.* Baines is one of considerable importance to householders in London. The Borough Council, wishing to institute a daily system of removal of house refuse, had served the respondent with a notice that he must cause the refuse to be placed in a movable receptacle at the edge of the kerbstone or footpath in front of his house. The notice had been given pursuant to a by-law made under sect. 16 of the Public Health (London) Act, 1891, and applied to a considerable area. The respondent occupied a house approached by a carriage-drive and distant some 40 ft. from the highway, and he refused to comply with the notice, and as the Council then neglected to collect the house refuse he proceeded against them under sect. 30 of the same Act. The case involved considerable legal argument, in which it was contended that the by-law was *ultra vires*, but the point decided seems simply to have been that the notice served on the respondent went beyond the by-law. The by-law prescribes that the refuse shall be placed on the kerbstone or the edge of the footpath, "or in a conveniently accessible position on the premises." In this case there was such a conveniently accessible position on the premises, and the householder was willing to place his refuse there, so the Court held that the proceedings against the Council must succeed, and they had without reasonable cause failed to perform the duty cast upon them to remove the dust. The larger question, assuming there to be no convenient place on the premises, as to whether by by-law a specified householder can be compelled to have the refuse placed in the public street remains undecided.

**The District Railway Accident.**

THE Board of Trade Report has now been published on the collision which occurred on the District Railway in November last near Mill Hill Park station. On this part of the line the signals are operated on the electro-pneumatic system, and the passage of a train into and out of any blocked section automatically places the intermediate signal at "danger" and at "safety," respectively. The signals are fitted with a train-stop apparatus, which, when a signal is at "danger," makes contact with a trigger on the train, thereby opening the valve of the continuous brake, and bringing the train to a standstill. From the evidence given at the inquiry it seems probable that the signal near the site of the collision was at danger when the Ealing train passed it. Major Pringle, the Board of Trade inspector, considers it to be proved that this was the case a few minutes after the collision. Thus a matter for explanation is why the brake trigger on the leading coach was not operated by the train-stop. The trigger actually struck the stop, but the movement given thereby was not sufficient to open fully the brake-valve. One of the railway officials suggested as a reason for this failure that the trigger mechanism had become twisted or otherwise disorganised—a tendency that is inseparable from most automatic arrangements. It is extremely important that automatic railway signals should be absolutely reliable, otherwise the employment of fogmen and ordinary fog signals can scarcely be dispensed with in the interests of public safety. The railway authorities are doubtless alive to the importance of this point, and we have reason for believing that they are already taking steps to remove the defects brought to light by the Ealing accident.

**Iron Roofs and Iron Ships.**

THE disadvantage that sometimes attends the use of similes is illustrated by one employed by Sir Benjamin Baker in the evidence given last week at the Coroner's inquiry into the Charing Cross accident. Sir Benjamin then made the incidental remark that, as regarded rust and stresses, the Charing Cross roof was in a safer condition than half the Atlantic steamers. This expression has been taken by some as a suggestion that such steamers were unsafe, an inference which, of course, was never intended to be drawn. Sir Benjamin Baker has now found it necessary to write a letter to the *Times* explaining that he merely meant that, although perfectly safe, most steamers were probably more pitted with rust, and were at the same time subject to higher calculated stresses per square inch on the metal than was the Charing Cross roof. In our opinion it is quite inappropriate to institute any comparisons between a roof and a steamship, for not only are the types of construction entirely different, but the forces to which the two classes of structure are exposed differ most materially, and the risks to which a steamship is exposed are in every way greater and more trying than those occurring in the case of a roof.

**Modern Surveying Instruments.**

DURING the year 1887 Mr. A. T. Walmisley described in a "Student's Column" series in the *Builder* all the best-known surveying instruments that were available at the time the articles were written. Since that date various new instruments have been introduced which are fully dealt with in a paper read by Mr. Walmisley on Monday last before the Surveyors' Institution, and of which an abstract appears in our present issue. Many of these new instruments are extremely ingenious, and are particularly adapted for use in the Colonies and other countries, but they are less serviceable in Great Britain, because, although capable of effecting great savings of time, the results obtained by their use do not come within measurable distance of those furnished by the familiar and well-tried instruments—the chain, the level, and the theodolite. In preliminary and approximate surveys of extensive regions where land is of little value, and where errors of a few yards, or even hundreds of yards, are not of great importance, much advantage is to be obtained by some of the special appliances described by Mr. Walmisley. On the other hand, in a country like Great Britain, and especially in large cities, where land is divided up into small parcels and is of relatively high value, the utmost possible degree of accuracy is essential, and it is necessary that measurements should be correct within a few inches. This point is one that is well worth remembering, and its importance is duly emphasised in the admirable and exhaustive paper to which we refer.

**The Lincoln Tramways.**

We find that we were misinformed in saying, in our "Note" of last week on "Surface Contact Traction," that "we understand the new electric tramways in Lincoln will be run on the Kingsland system." They are to be on the Griffiths-Bedell ("G.B.") system. The correction does not affect our argument as to the financial risks involved in expending large sums of money on the track of electric traction systems.

**The Resurrection Sculpture, Wells.**

Mr. St. John Hope writes to us, in reference to a parenthesis in our leading article of last week, to know on what grounds we are convinced that the resurrection sculptures at Wells are by foreign artists. We reply, on sculptural grounds. We know of nothing in English mediæval art in any way resembling this work, and no indication that English sculptors of the period had anything like the power of modelling the nude figure which is evident in this series of figures (if we make allowance for the action of the weather); and we speak from close examination of the work when a scaffold was up. We are quite aware that Mr. Hope and other archæologists are prepared with reasons for maintaining that these are English, but sculptural reasons are more powerful than archæological. All the archæologists in the world will not persuade us that these works are done by the same class of men who carved the stiff and unnatural (though highly decorative) draped figures in the lower portion of the façade.

**Hellenic Society.**

On Tuesday afternoon, at the meeting of the Hellenic Society, at the Society of Antiquaries' rooms, Mr. W. C. F. Anderson gave an interesting lecture on the subject of "Greek and Roman ships with Multiple Banks." The lecture was ostensibly a reply to one given last year on the same subject, in which it was maintained that the idea of the existence of ships with banks of oars one above another was a mistake, due to a misreading of references in Greek and Latin literature; that it was impossible and unworkable, and that the meaning of "*biremes*," "*triremes*," etc., was to be read to refer to the number of men at each oar. We considered this to be an exceedingly far-fetched idea; and the quotations which Mr. Anderson gave from various authors (which were photographed as lantern slides, so as to be more easily followed), and his exposition of them, went to confirm us in our previous opinion that the generally received idea of the Greek and Roman galleys having banks of oars one above the other is the most natural interpretation of most of the passages in ancient authors bearing on the subject, and that there was nothing impossible in it at all, though we may admit that it seems a somewhat clumsy way of propelling ships, and was rather calculated to ensure power than speed. There seems to be at present, however, rather an inclination to set the face against this interpretation, even in the teeth of what seems very obvious evidence. Mr. Anderson exhibited a photograph of one somewhat crude representation of a galley (we did not gather whether it was from a coin or a carving), where the two tiers of oars were shown so manifestly that one might have thought it conclusive, and the meeting was rather startled to hear one eminent Hellenist assert that it was only a conventional method of representing that the ship had oars on both sides, to show them both on one side; an explanation certainly more far-fetched than anything that has been urged in favour of what we may perhaps call the popular view. The same member was of opinion that three banks of oars would always be in collision, as the shorter and longer ones would not row at the same speed; but he was reminded that they could always keep time if ordered and directed (as they probably were) by music or some other form of signal. On the whole our decided opinion is that the *triremes* carry the day, and we shall continue to believe in them. The suggestion was made that some wealthy man should be invited to bear the cost of building a restored *trireme*, full size, as a practical test of the problem; which would certainly be an interesting though costly experiment. At the commencement of the meeting Professor Percy Gardner, who was elected provisional President, read a short memorial address in honour of the memory of the Society's late distinguished and lamented President, Sir Richard Jebb.

**The President's "At Home."**

The smoking "At Home" given by the President of the Institute of Architects on Monday was as well attended as these functions always are. A small but interesting collection of working drawings was hung on the walls, lent by Professor Pite, Sir Aston Webb, Mr. Flockhart, Mr. R. Blomfield, Mr. Ernest George, and two or three others; and in the Old Council Room was a special collection of working drawings of the Cardiff Municipal Buildings, by Messrs. Lanchester & Rickards. In the same room was arranged on the table a very interesting collection of medals of various kinds, some portraits and some including representations of buildings; these are the property of the Institute, but had been almost forgotten, and it was a good deed to bring them to light again. In the meeting-room also was to be seen a collection of casts from ivory sculpture, which had been presented by some one (we could not learn who) to the Institute at some former time; these also were new to the members. One hopes that there may be yet more hidden treasures in the archives of the Institute, to be produced at future meetings of the same kind.

**The Wrath of Professor Goodyear.**

Not content with circulating a pamphlet against us among English architects, Professor Goodyear has filled whole pages of an American architectural journal with a new edition of his diatribes, in which he has chosen, instead of referring to the *Builder*, to attack by name the person whom he assumes to have been the author of the offending article, a proceeding which we can only characterise as a most unwarrantable impertinence. What would people in England think of a writer who replied to a leading article in the *Times* by a personal attack on Mr. Buckle? We have of course long been aware, from former experience, that an American critic is always right, and that it is presumption for any Englishman to question his conclusions; but we never saw such a rampant demonstration of it as in this case. No one, we think, could say that our article entitled "The Glamour of Crooked Building" was in any point either offensive or ill-natured, but Professor Goodyear seems to have been so aggrieved at our declining to take him seriously that he has not only lost his temper but ignored the rights of anonymous journalism, and presents the singular spectacle of a man filling pages with violent writing in reply to a critic who he says all the while is beneath his notice. Reasonable persons will, we think, conclude that a writer who spends all this trouble in denunciation of his critic has probably felt himself to be rather hard hit.

**The Leicester Galleries.**

Three new collections are now on view at the Leicester Galleries, the most important of which is that of the one hundred drawings and sketches by Millet which were the property of the late Mr. Forbes. A good many of these are very slight, memoranda for figures or compositions rather than drawings; but there are others which are fine examples of Millet's work in black and white. The most interesting of all is the beautiful pastel in monochrome showing a later edition of the "Angelus" (82), in which the effect is that of dawn instead of the evening effect shown in the painting; in other respects the composition is the same. Among the larger drawings is the fine and energetic "Départ pour les Champs" (71), known through publication, in which the eager stride of the man, as if no time were to be lost, is a kind of summary, almost pathetic, of the burden of daily toil. In some of the drawings, such as "Une Paysanne gardant sa Vache" (84), Millet's care in the arrangement of his lights and darks is illustrated. There are some fine landscape sketches. "Les Falaises: Environs de Greville" (16) is a remarkable example of bold broad sketching of just the facts of a scene; others, such as "Les Ramasseurs de Varech" (61), are powerful studies of landscape effect. As examples of composition two are especially noticeable—the arrangement of the two figures in "La Leçon de Tricot" (54), and the whole composition of "La Bergère" (62), with its high back and mass of trees overshadowing the figure, contrasted with the clear light on the left; it is characteristic that the only weak point in the drawing is the commonplace and rather hastily indicated face of the shepherdess: Millet made no attempt to idealise his rustics, but the composition was worth a better figure than this. Among the most poetically suggestive of the drawings is "Le Soir" (67), an interior with two figures of seated women facing each other, one with her back to the spectator; it is very little made out, but perhaps all the more suggestive on that account. In the adjoining room a collection of water-colours by Mr. Lee Hankey, under title "Idylls of the Country," deals with a

class of subjects akin to those of Millet, and in a somewhat similar spirit. The pictures show a good many repetitions of the same *motif*—mother and infant variously posed, and the style of execution is rather too indefinite for our liking—a sponge seems to have gone over them all; but there are fine qualities both of feeling, composition, and colour in many of them; and the one on the largest scale, "We've been in the Meadows all Day" (33), is the best of all; there is a complete harmony both of colour and composition in it, and the mother's face is very beautiful, which cannot be said of many of the faces in other drawings. The little one called "The Meadow Farm" (47), however, where a girl in the foreground leans her back against a fence, is a bit of pure beauty. There are also some fine little landscape studies, of which the heath scene entitled "Stormy Weather" (65) is the best, and is a work of great power. The third element in the galleries is a small but very interesting collection of French illustrated books of the XVIIIth century, arranged in cases in the ante-room.

## ROYAL ACADEMY LECTURES.

At his second lecture on "Drawing," given at the Royal Academy on Thursday, the 11th, Mr. Clausen commenced by showing the slides which he had been unable to show at the first lecture for want of a lantern. The first was from a small drawing by Van Eyck for a picture of the Virgin seated in a landscape, with a great amount of background detail, and he drew attention to the care and minuteness with which all this detail was drawn out, in what was nevertheless only a preliminary study. Dürer's study for the hands and arms of his "Adam" showed the same minute care, especially in the three repeated studies for the hands. A head by Dürer illustrated what might be called the German manner in drawing, which was felt at once on looking at the drawing, though it might be difficult to define in what precise details this manner consisted. A composition by Breughel, "The Blind Leading the Blind," was shown as an illustration of the German angularity in the lines of the draperies. An early study by Millais, for an idea for "The Flood," an indoor group with one figure at a window looking out, was adduced as a very fine example of drawing, equal to anything of the same kind among the drawings of the Dutch masters. Masaccio's drawing of his well-known subject of Adam and Eve leaving Paradise followed; an example of figure-drawing which had hardly been surpassed since. The same painter's head of an old man was an example of precision in drawing and certainty in definition of features. A nude outline study by Raphael followed, and then a figure by Michelangelo (from the picture of the Bathers, if we remember right); a fine nude study by Stevens, and a drawing by Millet of a youth lying on the bank at the edge of a stream completed the series. [This last must have been an early work of Millet's, as he never drew nude figures after his first period.]

Mr. Clausen then said that in this lecture he wished to speak of drawing not so much as recording actual forms, but as recording the effect of form under special lights. This development of drawing from mere record of forms to a record of effect corresponded with the development of painting. The painters of the full Renaissance period had a wider range than their predecessors. With them a figure was not a single problem; each figure took its place in a general scheme of light and colour (which thus also included landscape). This advanced style showed not perhaps deeper insight into nature than was shown in earlier drawing, but a wider sympathy; the artists were interested in more things than the personages they represented. As examples of this he proposed to speak more particularly of the works of Watteau, Claude, and Rembrandt. Watteau was not so definite in regard to effect as Claude or Rembrandt; he, like Rubens, was on the borderland between the two styles, combining in some degree the elements both of personal interest and of general effect. Claude was not only careful in his definition, but also in effect, arrangement, and lighting. Among illustrations of this more developed school of drawing he commenced by showing a landscape of Titian's, in which the effect of light and shadow in modelling the landscape was illustrated. A sketch of a boar hunt, by Rubens, showed the care which he took in placing his masses of light and dark; the dark horseman against the light ground on the right, the light figure against a dark background on the left. A head by Vandyck was shown as a fine example of the drawing of form only. In Watteau the influence both of Rubens and of the Venetians could be very plainly traced in his colour and freedom of movement, though with a difference—with little graces of manner in his figures which were peculiar to himself and which Millet did not like ("marionettes," he called Watteau's figures). A nude study by Watteau which was shown conveyed a strong sense of the influence of Rubens. Two studies of a man with a guitar, and another study of four figures, showed Watteau in his more usual style; and in the indications of the costume here, and in another study of a mother and child, they could see how the lines and shadows of the drapery represented effectively not what actually was there, but what appeared to the eye, and were treated so as sufficiently to indicate the form beneath. A particularly fine and characteristic drawing which followed this was one representing a figure seated on the ground with the back to the spectator. A landscape of Gainsborough's followed; Mr. Clausen remarking that it was undoubtedly very conventional, as were all Gainsborough's landscapes, but that it showed a very effective arrangement of lights and darks. In regard to Claude, it might be said that he appeared a greater artist in his numerous drawings and studies than in his finished paintings. He had a remarkable power of showing the effect of the sun in a clear sky, and also the receding planes of a wide prospect. In these respects he had never been surpassed, but his finished landscapes had too much the effect of a methodical planning, a look of being "composed," and the classic figures in his foregrounds added to this conventional effect. Conventional landscape of this kind was a thing one got rather tired of. But his drawings of trees and temples were not only prettily arranged, they were real and delightful studies from nature, more attractive than the finished landscapes with the mythical figures. These latter were in the taste of the time; mere landscape as an object for its own sake had hardly been thought of then. The criticism which had been made that he could not draw trees was true of the conventional Claude of the pictures, but not true of the Claude of the drawings. Several slides of Claude's drawings were then shown; a portrait of a tree, obviously a genuine study from nature. Of one showing a hedge, trees, and a river the lecturer remarked that it was a kind of drawing which seemed to suggest the origin of Corot. One showing a half-buried Roman triumphal arch in a tree-less landscape was remarkable for the power of treatment of the foreground. It was Claude's practice in his studies of landscape to make a careful outline and then arrange tints on it. Sketches from nature by the old masters were rarely in colour, and were not coloured after nature; but the balance of light and shade was from nature. It was on record that Claude did occasionally paint a picture entirely from nature, but no such work by him was known to be in existence; and apparently he did not search so much for exact truth of colour as for truth of light and shade. Only one of Claude's known drawings was altogether in colour. Turner's early landscape studies were all in outline, and tinted afterwards; but later he sketched from nature in colours. In modern landscape we were more true in detail of colour, but there was the danger, in seeking that side of the truth, of losing the grasp of the scene as a whole. It was exceedingly difficult to combine success in both points—in truth of detail and in the grasp of the whole; perhaps Turner came nearer to it than anyone else; but in general it would be found that something must be given up on one side or the other.

Rembrandt's great power lay in his sense of the gradation of light and shadow, and in the human sympathy and dramatic insight which characterised his compositions.

In Keene's black and white drawings we found great care taken to indicate the line or form which shadows took. Phil May's accent in his drawings was determined by line. Keene's was determined by shadow. In Rembrandt's pen-sketches of landscape it would be found that a finer pen was used for filling in the distance. A drawing of Rembrandt's was shown which, with very little work on it, conveyed admirably the effect of a winter scene; also a fine drawing showing the effect of a mass of trees giving a concentrated dark in one portion of the composition. But any method was good as long as nature was followed intelligently. The best method perhaps was to draw in lines first and fill in the light and shadow afterwards. In Madox Brown's "The Last of England" they had an example of a picture that was intensified by the separate study of each detail; there was no losing or finding in it. Rembrandt's drawing of "The Shepherds" was an effect got by quite opposite means. The one was like a story told; the second a suggestion—vague but full of human sympathy. Ingres was the opposite of this; he showed the utmost beauty of form; the scientific side of the artist's work evinced by skill in drawing; but we did not trouble ourselves much as to what his beautifully drawn figures were doing, and his pictures could not be said to be interesting. Ingres represented the scientific side of art, Rembrandt the emotional side. Such differences occurred because art was a personal expression. Two scientific men at opposite sides of the world would work out the same problem in the same way; but two artists might treat the same problem quite differently. The Ingres school was too perfect in execution in comparison with the thought expressed; Rembrandt, the man who had something to say, affected us more, even if he worked with less perfection of method. Different aims, however, might each be true in their own way; no one could claim that his alone were true. "Truth to nature" was indeed a phrase often very loosely used; we could not well define in what it consisted. The great thing was for each to best use his own means to attain it in his own way.

Mr. Clausen's third lecture, on "Quality in Colour, which was delivered on Monday, was unillustrated, there being as yet no means of representing colour design by the lantern. He commenced by observing that when we saw an engraving or a photograph of a painting we often found that we got quite a different impression from that which the original picture gave when we came to see it. A work might be effective in black and white, but not in painting, since this depended on the effect of the colour; and colour was a thing full of mysteries. The colours might not be actually those which they stood for in the picture; that, for instance, which had the effect of white in the picture might not be really white, but only something which appeared so in relation to the other colours. That was a question of what was called "value." "Quality" was a different element, which depended mainly on the way in which the colour was put on. If the same composition were painted by two different persons, we might find one looking heavy and dull, the other bright and attractive, though the same pigments had been used: in the latter the colour had been clearly laid on, not churned and muddled; and this was the characteristic of colouring in the finest works. But a picture might have fine quality in colour and yet not be harmonious, harmony consisting in the right colour relation of the various parts; and it might be harmonious as a whole without good quality in parts. In the early Victorian days it was thought that quality was the principal thing to aim at, and there were consequently many works painted at that time of which the quality was excellent, but which showed no true harmony of colour. The existence of good quality was a proof that the artist, in a sense, knew his business—understood how to lay colour on. But what had preserved the reputation of the greatest treasures of art was, more than

anything else, harmony of colour, which appealed to us more strongly than accuracy in drawing. The works of Ingres, Scheffer, and Gérôme, were all admirably drawn, yet they failed to retain our sympathy on account of their poor colour, and could not stand against the work of Delacroix and Bonington. Manet's drawing was often bad, but he had the feeling for colour which made his work effective. Velasquez was one of the few who had succeeded in combining fine quality of colour with draughtsmanship.

It had been said that "Time and varnish were the greatest of the old masters"; but it was a shallow saying, for nothing could ever make a bad picture into a good one. Varnish might have imparted a certain richness of tone in some cases, but the colour must have been good to begin with. In Crivelli's altarpiece in the National Gallery the figures were as fresh now as when painted; the quality of the paint was beautiful: this had never been varnished, and varnish would only spoil it. The same point would come out in comparing H. Morland's work in the National Gallery with that of Hogarth and other great painters of the period, in the same room; these latter, though darker in parts than H. Morland's work, were brighter and more brilliant in general effect.

Fresco, tempera, and oil had each their special qualities. Oil was the most supple medium, because it could be used in three ways, either as transparent colour, as opaque colour, or as a mingling of the two methods; and in fact most of the greatest works in oil painting had been laid out in this mixture of methods. Consequently, oil paintings were much more various in effect than fresco or tempera painting. Fresco had a far less range of possible colour. On the other hand it had a beauty of surface of its own, arising from the granulation of the plaster into which it was painted, which reflected more light than an oil painting, producing also minute lights and shadows all over the surface which gave it a kind of grey lustre, and assisted to harmonise the colours. A somewhat similar effect was produced from the ground in a tempera painting, and might even be produced in oil when painted thinly so as to show the inequalities of the ground; but varnish filled up the cavities and destroyed this effect. In fresco no alterations could be made; and in tempera, though it was possible to make alterations which did not show as such at the time, they unfortunately showed up at a later period. This could be noticed in Piero di Cosimo's "Procris" in the National Gallery, where there had been a correction made in one of the hands, in consequence of which the colour was muddy there in comparison with the rest of the picture.

As a piece of fine and beautiful colour not often noticed he would mention the landscape background of Michelangelo's unfinished painting of "The Entombment," a bit of thin colouring laid over a white ground, which had all the clear bright effect of real sky.

The painter's method in many early works was the reverse of ours; the lights were transparent and the darks loaded with colour, as they might see in the works of Bellini and other early Italian painters. In modern painting it was more the custom to paint the lights in solid colour, and in fact it was this power of body light which gave oil painting the victory over tempera.

Painting a picture straight off with all the colour laid on at once as it was intended finally to appear, which was done not infrequently in old work, implied a most perfect command of the means employed. No one could do it now; the required balance was obtained by slow degrees and repainting. The old painters were ignorant of many things that we had been obliged to learn; but nevertheless those who could paint a picture with the desired effect straight off, and without retouching, might truly be called great masters. Such examples showed the advantage, no doubt, of knowing exactly what one was going to do, but the problems were simpler; we were more difficult to satisfy now. In the sleeve of the portrait by Titian, said to be that of Ariosto, they had there dark colour, yet it was full of light; in all probability it was painted thinly over a white ground; a process which Titian seemed able to carry out without the risk of a mistake. In Titian's later works the colour was very simple throughout, laid on in large masses of red, blue, etc.; generally a thin colour over a light ground. If he had to make alterations in any portion of a work it would seem that he erased it down to the ground and built it up afresh. Watts, on the other hand, when he had to make an alteration, painted in a figure, or whatever was required, in a strong black and white monochrome, and then coloured over that, the original work being entirely hidden. Titian's quality in colour was always fine, but to this he joined the element of harmony also, especially in his manner of arranging his lights and darks; and this was the case also with Rembrandt. Though some of Rembrandt's works, single heads especially, were full of reglazings and alterations, he at other times painted quite simply. The head of the old lady in the National Gallery was apparently painted straight off at one operation. Glazing and repainting served however practically to increase the range of colours.

Quality in colour was the outcome of perception and feeling rather than of any adherence to rule. To paint the apparent colour at once was good, if they could do it; but there were difficulties; the system would not accomplish everything. One must vary the kind of painting—transparent colour in one place, solid in another place—otherwise a certain monotony would result, as they could see in the works of Franz Hals, the picture now in Burlington House especially. There was a beautiful quality of colour in Watteau and Gainsborough. Watteau showed bits of solid bright colour contrasted with transparent darks. In the charm of lightness of touch Gainsborough was supreme; even Velasquez (if he might venture to say so) looked a little heavy in comparison with Gainsborough. This had particularly struck him when the Venus by Velasquez had been hanging between two Gainsborough portraits at Messrs. Agnew's Gallery. No artist showed so much of the charm that comes from the sense of ease of execution; it was so clear, such a different kind of paint, one might say, from most other pictures. Many modern pictures got leathery in appearance through the practice of "oiling out," which had quite a different effect from that of mixing colours with oil. Solidly painted pictures, laid on over and over again, were generally heavy in appearance; though when the paint was laid on so thickly as to cause a certain degree of relief of surface, the effect of this would to some extent counteract the appearance of heaviness.*

Wilson, Romney, and Morland were all artists who painted solidly throughout, and their pictures had a rich fat surface. Hogarth's portraits had a somewhat heavy effect from over-painting, being worked over many times. Some of the old painters, as for example Canaletto and Claude, would paint in light thin colours over a dark ground. The result of this was that in process of time the light colour became more transparent and the dark ground showed through it. It was safest to paint equally solid throughout; in that case it was of no ultimate consequence whether the ground was dark or not. This clear and certain touch was one of the secrets of permanent painting; the less one did to the paint after it was on, the better paint it was.

It was eminently desirable for the artist to know exactly what he wanted. One of the best methods of study was one little practised now, viz., that of painting Still Life; flower subjects especially. There was no sense of effort in flowers, and their study was one of the best means to render the hand light and sensitive. Velasquez and Chardin were examples of painters whose work was free and not laboured; and perhaps the treatment of mere painting so as to make it beautiful and attractive in itself, independently of the subject treated, had never been carried further than by Claude.

In old pictures one often found the method of glazing done with warm colours over a thickly painted surface. Should we imitate this? He thought not, because it was a mistake to deliberately adopt another man's method which did not come naturally to ourselves. We could discern this method in Reynolds, and could see how he made it serve his purpose, but it was not wise to take up and copy another man's experience ready made. Watts practised this method in his later works, but his early work was very straightforward in character. Velasquez, Vandyck, and De Hoogh were among the best models for method in painting—combined of course with the study of the effects of Nature.

* We might instance Dupré's powerful landscape, "La Mare aux Oies," where the clouds are loaded on quite in relief, yet the picture could never be called heavy.—ED.

## THE SURVEYORS' INSTITUTION.

AN ordinary general meeting of the Surveyors' Institution was held on Monday, at No. 12, Great George-street, S.W., Mr. C. Bidwell, President, in the chair.

Mr. Percivall Currey, hon. secretary, announced that a number of donations had been made to the Library and Library Fund, and, on the motion of the Chairman, a hearty vote of thanks was accorded to the donors.

*Modern Surveying Instruments.*

Mr. A. T. Walmisley then read a paper on "Modern Surveying Instruments," in the course of which he said that, in 1887, a series of articles descriptive of the use and construction of the best-known instruments employed by surveyors formed the subject of the Student's Column in the *Builder*, and repetition of the explanatory matter in these articles was not, therefore, necessary. In his own experience, there was no survey so accurate as an ordinary chain survey properly triangulated, and the measurement of horizontal distances in levelling operations by the chain was a system unrivalled for correctness. Various ingenious devices had nevertheless been brought forward to attain, not only records of levels, but also horizontal measurements by optical instruments, and for giving greater simplicity of setting up during outdoor work, transport in the field, and other improvements calculated to aid speed, accuracy, and concise records, independently of these influences upon the question of price of an instrument. He proposed to draw attention to a few modern types of instruments with the view to remove the prejudice which exists against the adoption of such new forms as time economisers, where the accessories could be proved to be free from liability to derangement, and easily attached for use. A beginner should start with an instrument supplied by a good firm of manufacturers, although an experienced surveyor, who thoroughly understood the use of an instrument with which he had to work, might be well able to attain accuracy with a less perfect instrument. For a beginner, a 14-in. dumpy level, without the addition of a compass (which only increased the cost), and with comparatively heavy tripod legs for stability in the field, would undoubtedly prove the most suitable, but an experienced surveyor could work equally well with a 12-in. or even with a 10-in. telescope, supported upon lighter tripod legs.

In speaking of various forms of levels and their arrangements,* the author said that Mr. Blochins and Mr. Lyne Freeman connect the parallel plates of new instruments by vertical screws having a deep pitch, through which works a second screw, having a fine thread, and terminating in the locking plate; the fine threads work within the deep thread screw, and a small clamp is provided upon the upper plate for use if either one of the deep-pitch screws should adjust too quickly for the attainment of a level bearing. When adapting this device to an existing instrument, a second set of parallel plates, connected by parallel plate screws having greater pitch than the existing screws of the instrument, were added. This additional set of parallel plates was attached to the tripod head, and the original set of parallel plates which carry the instrument were connected to this apparatus by a bush, the size of which was dependent upon the requirements of the instrument. The approximate level was first sought by use of the deep-pitch screws, and the final adjustment attained with the small-pitch screws. In a level made by Mr. Stanley, the centre was cast in hard gun-metal in one piece, with, and directly upon, the telescope body and object end, the cast telescope body being bored out to a suitable thickness so as to provide an instrument combining strength and rigidity, with reduction of weight, compared with

* See our issues, January to June, 1887.

the old form of tubular body, collars, and stage. This instrument was denominated the new Engineer's Level, and was fitted with clamp and tangent adjustment, tribrach levelling, and locking-plate, so that it could be used on a wall or masonry coping, as well as on the tripod.

In most modern dumpy levels stadia lines are now added in the diaphragm set to 1-100, so that in taking the readings, on a distant staff by means of these subtense lines, the surveyor reads every 1-100 foot (or metre) upon the staff as being equal to 1 ft. (or metre) of the distance from the centre of the instrument, adding to the reading a constant for any distance shown. This constant was usually given by the maker of the instrument, and could be checked experimentally by the surveyor.

In Brightmore's collimation adjustment for use in the telescope of a level, a sliding plate was attached at the back of the eye-piece, on the face of which cross hairs were stretched, the sliding plate being caused to move in a groove in the diaphragm by a screw pressed against its support by means of a spring. It was made by Messrs. Elliott Brothers, and could be fitted to theodolites for adjustment in one or two directions at right angles. The diaphragm might consist of (a) webs, (b) platinum iridium points, or (c) lines on glass. Mr. Stanley argued that the use of iridium points obviated the covering of the divisions on a level staff, but Messrs. Troughton & Simms, who had given considerable attention to the construction of optical instruments, adhered to the old form of spider-web diaphragms as preferable, both for reading an ordinary level staff or a special stadia rod. Messrs. Cooke & Sons also maintained the superiority of web diaphragms, except for reversible eye-pieces. The author then described a number of diagrams of instruments. Diagram No. 1 showed a 5-in. theodolite fitted with Fergusson's circles, which gave the semicircle divided into four parts, each octant being subdivided into 100 unequal parts by drawing lines through the centre of the circle through the octant arc to intersect 100 equal divisions of the tangent to the octant, so as to be read in percentage divisions of angular measurement on one half of the circle and in units of a degree upon the other half, thus converting the instrument into a telemeter.

Hoskold's form of transit theodolite was made by Messrs. John Davis & Son, of Derby. Except the bearings, bushes, and screws all possible parts are constructed in aluminium, and the telescope is fitted with a sensitive spirit level independent of the theodolite part. A plan of the instrument was shown, and a plan of a wall plate with clamping arrangements. In this form of transit theodolite, an extra large and sensitive bubble was also attached to the vertical circle. The micrometrical eye-piece reads to one second of arc. The sights above the telescope were removable. The internal vertical axis, which was screwed to the horizontal vernier circle, was made larger than usual, and, instead of being solid, was perforated for its entire length, and had a cylindrical form, the hole through it being about 1 in. in diameter. This axis works in another or exterior vertical axis which was screwed to the underside of the horizontal divided circle, and the axis revolves in a socket which forms the central part of the levelling apparatus. In order to avoid too much friction, the exterior parts of the two axes were, in two or three places, turned down below the general level. A corresponding hole to that in the central axis was made in the centre of the horizontal vernier circle in order to obtain a direct sight through the telescope and centre of the instrument down a shaft or central pier opening. The telescope could be raised through a sleeve or axis collar to clear a horizontal base, enabling standards to be constructed shorter than in most instruments, so as to contribute compactness to the instrument. Some instruments were made with covered limb and turn-up microscopes for protection in conveyance. The instrument was graduated upon silver to read to 15 secs., but had also a micrometrical eye-piece attached reading to single seconds of arc. The arrangement for taking small angular records enabled a subtense process to be adopted, which consists in setting up a rod, say, 20 ft. in length at any distance required to be known, and measuring the angle between two metal discs, one placed at each end of the rod, and then by the application of trigonometrical calculations finding the distance required.

In Davis's traversing stand, designed for use with the Hoskold Civil and Mining Engineers' Transit Theodolite, when the telescope of that instrument was employed for sighting down vertical shafts, the frame supported by the legs was circular and 12 in. in diameter. This supported a tube across the centre, a corresponding tube, running parallel, being attached firmly to the circumference. Along these tubes a carrier traverses, to which was screwed the usual centring apparatus common to all theodolites. The theodolite was brought approximately over two points fixed at the pit bottom; it was then traversed on the stand, which allowed a movement of 6 in., and it could also be adjusted in any direction for about 1 in. by the centring motion. The centring motion was then clamped, the long traverse was also clamped, and the fine adjustment comes into operation, bringing the vertical spider line into coincidence with the two illuminated marks placed at the pit bottom. Mr. W. G. Bligh, M.Inst.C.E., introduced a vertical adjustable base, with the view of setting an instrument always at a fixed height above a peg, to attain which the instrument, instead of being screwed on to the top of a tripod, was attached to a thick hollow brass rod which, passed through a hollow socket formed in the head of the tripod. This rod, 18 in. in length, could be clamped at any desired height, and at its extremity hangs a chain to which was attached a brass disc, so that when the disc touched the top of the peg over which the instrument was set, the line of collimation in the telescope could be arranged to be some even number of feet or half feet above the level of the peg. Mr. Bligh had also introduced a simple alternative arrangement in which the instrument was mounted on a wooden post which was threaded through a large brass socket formed on the head of the tripod, the purpose of the tripod being to hold the post upright.

In Wells's Improved Theodolite, made by Messrs. Elliott Brothers, the principal advantages claimed were as follows:—1. A method of fixing the locking-plate, whereby the locking-screw was fixed on the outside, and was easy of access. 2. The winding of the plumb line on a drum through the centre of the instrument, providing an easy method of regulating the height of same, and by this means enabling a plumb bob to be used when the instrument was placed on a fixed stand at a minimum depth below it. 3. A new shifting centre which had two definite movements only, viz., a sliding and a rotary movement so as to obtain a wide range of action. The former was to be used when the plumb bob was lowered to the level of the station point, the distance from the same being measured, and the instrument moved a corresponding distance on a scale marked on both sides of the plates which hold in position the sliding-plate. The centre was then clamped with a locking-screw at the bottom of the shifting centre, and the instrument was then revolved on its true centre until the plumb bob comes over the station point. The distance from the station point to the plumb bob, when the instrument was at zero, was the radius of the circle described, so that when this radius was fixed the station point must be in the path of the periphery of the circle so described. The shifting centre being self-contained, was, when the instrument was once levelled, always level, no matter in what direction it was required to bring the plumb bob over the station point. This could be adapted to any ordinary theodolite without altering the main construction of that instrument.

Messrs. Cooke & Sons advocated Littlejohn's patent stand to provide combined centering and levelling arrangements. This could be easily fitted to an old 5-in. or 6-in theodolite. Mr. Stanley's Dunbar-Scott auxiliary top and side telescope, being interchangeable with the top and side positions, and having the means provided to ensure perfect adjustment with the minimum of trouble, claimed to form a mining transit which would perform all requirements in mine surveying, and so need no correction for eccentricity. The auxiliary telescope was provided with a centre that might be screwed to the threaded extension of either the transverse axis or the vertical pillars of the main telescope. In either position it was clamped firmly and ranged quickly into alignment with the main telescope by two opposing screws. The diaphragm of the auxiliary telescope had one web only, so placed that it was vertical when on top, and horizontal when at the side. The observation of steep horizontal angles was made with the auxiliary on top, and of precipitous vertical angles with the auxiliary on the side. A counter-balance was provided which exactly balanced the auxiliary member, so as to obviate the effect of strain upon the instrument. In Stanley's new model transit theodolite the parts were not built up in separate pieces, but every possible casting was shaped out of the solid into the finished form. For convenience of packing, he (the author) personally preferred the old form of separation in the instrument box to the single type of complete instrument in one piece; but then "use is second nature," and he had been brought up in the old school, and accustomed to pack the telescope, the body of the instrument, and the parallel plates in separate pieces.

Surface levels could be expeditiously compared by the use of an aneroid. The surveying aneroid was held in the hand at a known height over a peg or bench mark, and the incidence of the needle upon the graduated scale of heights was read off on the vernier. Other readings taken in a similar manner over points that could be located enabled comparative levels to be recorded, due allowance being made for the diurnal wave and local barometrical changes during the time the operations were in hand. Precautions might be taken to neutralise such disturbances by using twin aneroids, two observers being necessary. The one remained stationary in a position as close to the day's operations as convenient, and had one of the aneroids upon a table before him, the reduced level of which was ascertained by connecting it with the nearest peg on the traverse, the level of which was already recorded, and every succeeding half hour the observer read and booked the incidence of the needle on the graduated circle for future comparison with the aneroid used at the same time by the observer in the field. The range of the instruments need only be reduced within reasonable limits, as the result was approximate.

The principle of a tachometer and the effect of the addition of a fixed tube and stop-piece to a theodolite telescope was shown in Diagram O. Considering such an instrument as a transit theodolite with an extra lens added to the telescope to convert it into a telemeter, the use of an anallatic or conveying lens (6¾-in. focal length to an object glass of 12-in. focal length) in a tachometer dispensed with the addition to every reading of what was called "the constant" of the instrument, which was always necessary in the case of theodolites merely provided with stadia lines to attain a similar object.

The principle which governed the action of the instrument dominated its construction. In order to overcome the loss of light occasioned by the introduction of the extra lens, the telescope of a tachometer was made correspondingly larger than that of a theodolite, while at the same time eye-pieces of higher power were employed, which facilitated the reading of the stadia rod with ease, and accuracy. The focal length of the anallatic lens depended in different instruments on the focus of the object glass and the distance the webs were required to measure. The eye-pieces were made to slide vertically across the eye-end by means of a rack and pinion movement, so as to obtain a better view of the outer pair of lines. A very small movement sufficed for this. The lines on the diaphragm were usually placed so as to provide a ratio of 1 in 50 between the outer pair, and 1 in 100, or 1 in 200, between the inner pair and the anallatic lens served to make these values constant for any distance. For very long distances an omnimeter permitted of greater accuracy than a tachometer, as the range of a tachometer was limited by the distinctive readings of the divisions recorded upon the vertical staff. It was necessary that the position of the anallatic lens with reference to that of the object glass of the telescope should be fixed and unvarying, and hence the adjust-

ment to focus was maintained at the eye-end of the telescope.

The Bell-Elliott tachometer had a powerful microscope permanently fixed at right angles to the telescope as in Eckhold's omnimeter, both the microscope and the telescope revolving upon the same axis. A special staff 10 ft. long accompanied the instrument, and this staff was fitted with two sighting cross-pieces, the lower one being preferably adjustable in vertical distance from the upper one. This tachometer formed a tangent reading instrument, the vertical height and the horizontal distance from the vertical axis of the instrument being calculated from the tangent of angles read upon the staff. The natural tangent of any such observed angle was read direct either from the drum scale or from the drum and tangent scales combined. Hence the use of tables in the field was not needed. The tangent scale could be moved backwards and forwards by means of the micrometer drum-head attached thereto, which in one revolution caused the tangent scale to move a definite number of parts of the radius determined from the axis of the instrument.

Mr. W. H. Wells, M.Inst.C.E., introduced into the diaphragm of a level a second horizontal cross-line, fixed either above or below the central cross-line used for collimation, at such distance therefrom as to bear a relative proportion to sights read through the telescope at a distance of 100 ft. apart. The vertical readings were taken upon the two cross-lines of the diaphragm so as to record the vertical space upon the staff at a distance of 100 ft. from the centre of the instrument. If the second cross-hair was so placed as to record one foot distance vertically on the staff, above or below that read by the centre cross-hair, then the proportion of vertical distance to horizontal distance was 1 in 100, and thus, by this simple contrivance other distances might be relatively arrived at.

Mr. Short's gradient telemeter level, supplied by Casella, also seeks to obtain linear distance gradients for railways, irrigation, drainage works, etc., by the aid of a level staff, without the use of a chain or tape, regardless of rough and broken ground or the intervention of a stream or other water between the observer's station and the distant object.

By the use of such instruments an immense amount of work might be saved in setting out the surface of land for width of slopes or batters by pegs, over the ordinary system of pegging, by calculation with a theodolite, where each peg required a separate setting of the instrument. In taking cross-sections and all levelling on sloping, uneven ground, the saving of time and labour was also very great, and the work resulting therefrom was sufficiently accurate for trial sections and preliminary investigations.

In Sir George Leach's level a small telescope with a spirit tube on the top was pivoted off its centre towards the object-end on a thin brass circular plate with a weight under the centre to keep the instrument level laterally and the cross-hair horizontal. The level itself was actuated by a small fine-threaded screw directly under the telescope, working freely on the circular plate. The end of the pivot being spherical, and the plate circular, the telescope and level could be revolved in any direction. Adjusting screws were provided to place the level in accurate adjustment, and a levelling staff, rather over 8 ft. long (folding in half for convenient transport) accompanied the instrument.

Mr. Sheldon's suspension level, made in 1893, could be used for taking flying levels between two fixed points, by stretching a fishing-line or thin wire over a distance of about 100 lineal yds. in order that the level of one point might be transferred to another point. When the bubble was in the centre of its run in the centre of the suspended line the extremities of that line were at the same level, and when the ends of that line were at the same level the bubble of the instrument would be in the centre of its run in the centre of the suspended line.

Mr. Stanley had a combined mining dial, level, and theodolite, fitted with sliding stand and Hoffman head with clamp and tangent movement to the limb. The telescope was fitted with stadia points and a gimbal carriage, cranked in form, and enabled the surveyor to read through the telescope at right angles in two directions.

Messrs. Adie (Westminster) had also brought out a combined level and theodolite. Used as a transit theodolite, the telescope was rendered steady by the attached vertical circle, but when used as a level a German clamp was introduced for the purpose. He did not advocate the adoption of combination instruments. They were very ingenious, but a surveyor generally had notes to make relating to external circumstances, besides recording angles and distances, and he did not need his attention to be distracted by clamp screws which were not required to be manipulated for the special object of the inquiry.

In reflecting hand levels the reflecting plate divided the vision half into a direct or through sight and half with the reflection of a bubble in a mirror. The same process formed the principle of Captain Abney's level. Sir Howard Grubb had sought to improve this arrangement by producing, with the aid of chemical deposition of a specially prepared film upon a plate of glass, a surface rendered capable of reflection, while simultaneously transmitting a large percentage of the light which fell upon it, so that two objects in different directions were presented to the eye of the surveyor either directly or through the object glass of an observing telescope.

In the Grubb miners' dial the object to be observed was viewed through a tube. The sight and object were virtually on the same plane; there was, therefore, no strain on the eyes due to focussing two or more objects at different distances. The eye need not be close to the sight nor in the centre of the sight, as there existed no parallax error in the Grubb instrument. The sight was readily illuminated underground, and might be preferably constructed of a short piece of rectangular brass tube, about ¾ in. square, 3 in. long, open at both ends. About midway in this tube, fixed at an angle of 45 deg., was a plate of glass, coated with a semi-transparent and highly effective film, chemically deposited on its surface. At right angles to the square sight, and opposite to the reflector, a circular tube was fixed. At one end was a diaphragm coated with opaque material, through which were cut or photographed cross-lines, a star, a scale, or any other convenient device. At the base of this circular tube was an achromatic lens, to a focus suitable to the distance between the lens and diaphragm. This achromatic lens brought into parallelism the luminous rays from the markings on the diaphragm, which rays were bent at right angles by the reflector and directed into the eye of the observer, the result being that the rays from the diaphragm entered the eye under exactly the same conditions as if from the distant object, and the surveyor saw the image or sight-lines virtually superposed on the distant object—that was, at the same distance.

It was not claimed for the Howard Grubb system that it would displace the telescope in standard instruments, such as the theodolite and level, but such instruments were often used for work for which they were not suitable, and in which their accuracy delicacy, weight, and size were a disadvantage. Portable instruments, such as the clinometer, Abney level, and Prismatic compass might be constructed with the Grubb sight and without complicating the effect of observation; the level angle of declination or direction might be simultaneously observed. The main feature of the Grubb sight was that it sought to eliminate errors due to parallax, as the rays of light entered the eye in parallel lines by the aid of the pair of convex lens introduced in the construction. The demerits of the prismatic compass were the shortness of the line of sight due to the small diameter of the instrument, the tendency to force the needle when the box was tilted in use upon uneven ground, and the effect of weight of the graduated card or rim carried by the magnetic needle, which tended to introduce sluggishness in the movement of the needle.

Puller's new tachymeter sought to obtain the plans and levels of the observed points without the necessity of noting the distances and horizontal angles, and thereby enabled the surveyor to dispense with the labour of calculating and checking the results. This instrument consisted of a horizontal circular plate, about 16½ in. in diameter, mounted on a tripod. The plate was graduated to read horizontal angles, and at the centre was a vertical axis carrying a telescope upon one side and a projective apparatus upon the other. The arrangement consisted of graduated horizontal and vertical scales connected to the telescope and receiving motion from it, and by means of which the distances and heights were read off, and the observed points plotted, when weather permitted, upon paper stretched upon the horizontal plate by pressing a needle-point into the paper.

The Eidograph had superseded the Pentagraph, as by its principle of construction the friction of the supporting wheels to the Pentagraph was entirely obviated, and there was consequently less damage to the drawing paper involved in its use. A level drawing board or table free from indentations was desirable.

Professor Goodman had patented a planimeter. It consisted of a tracing-leg held in the right hand, and a hatchet held at a point outside the boundary to be traversed, the instrument forming an inverted channel. The hatchet should not be allowed to work on a rough surface—smooth writing or drawing papers were alone suitable. This instrument was simpler than Amsler's planimeter in construction, but was not likely to be so extensively employed for accurate work.

Mr. J. Bridges Lee had shown how photography might be combined with surveying in a manner that should fix the direction of view upon a plan so as to embrace full detail as viewed through a telescope, and he argued that, having all the landscape thus recorded, a surveyor could select at leisure any topographical details he required to be known. A complete description of this photo-theodolite was given by Mr. Bridges Lee in a paper read before the Society of Engineers in 1899. He effected his purpose by adding a fixed focus camera set up on a stand and accurately levelled so as to make the picture plane truly vertical. The line of view was also marked on the photograph, and its position on plan recorded upon an horizontal plate whose centre was vertically under the centre upon which the attached telescope revolved. It was probable that photography would prove quite as satisfactory a process as the method of fixing survey lines by the magnetic needle of a compass for general plans, and that it would come gradually in greater use for assisting the surveyor to record not only the base lines of plans, but the vertical section lines of the surface of the ground. Building plans, in which dimensions were to be stated, must, of course, be correctly measured in the field, but for index or key plans showing general position and surroundings, the value of photography was universally acknowledged.

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In the course of the discussion which followed, Lieut.-Col. Sir G. Leach, K.C.B., hon. member, moved a vote of thanks to Mr. Walmisley for his very able paper, which gave such a clear account of the instruments in use for surveying purposes, and which it was desirable that they should preserve for future use. Surveying varied in character very much, and the instruments must be adapted for the purpose of the work to be done. Mr. Walmisley had not alluded to the most magnificent surveying instruments which were ever made, *i.e.*, two theodolites with 3-ft. circle, made a good many years ago by the original firm of Troughton & Simm, one for the Royal Society, and the other for the Ordnance Survey. Of course, no matter what the work was, the instruments were all based on the same principles, but an ingenious man would probably discover little points and make changes, etc., which would facilitate his work. That happened in his own case. One of his hobbies was landscape gardening, and, as they knew in the lay-out of roads, etc., a level was necessary. He wanted a small level, and, as he never felt confident in the work he did with the level, he set to work to invent a small level for the purpose. The characteristic of it was that it could be taken about anywhere, and it was not a plaything, but a useful tool, which had been found useful in India and for architectural purposes. The architect had constantly to take levels to determine the site of his buildings, etc., and this little level could be carried

about in a bag, and the staff could be used as a walking stick. The level was very light, and he had done some very accurate work with it. Of course, if they had to level for a railway for fifty or sixty miles, they would want a better instrument. He was one of those engaged in the great levelling work for the Ordnance of the country, and they had no difficulty in getting most accurate work with the ordinary level.

Mr. C. J. Mann seconded the vote of thanks. He said that building surveyors did not very often have to use very elaborate instruments. Mr. Walmisley said there was no survey so accurate as that made with an ordinary chain, and he was glad to hear that. He had also been interested to hear Mr. Walmisley's remarks as to the part that photography was likely to play in the future on this matter. The members, especially the younger members, must feel deeply indebted to Mr. Walmisley for the pains and trouble he had taken in the preparation of his paper.

Mr. J. W. Tyler said they did not often use these elaborate instruments. They used the theodolite and the level sometimes. The level with the stadia reading he had found of great assistance in making preliminary surveys for railway work, and the work could be done with a considerable degree of accuracy. As to the material for the manufacture of surveying instruments, aluminium had been used largely lately, and he gathered that it was not so desirable for the heavier class of instruments.

Mr. D. Gravell said that one was amazed at the enormous number of instruments which had been invented and constructed. The micrometer, as applied to the theodolite, seemed to be the principal invention since the articles in the *Builder*, and it was useful for tunnel work, but for ordinary survey work the vernier arrangement was ample. As to what had been said about the chain being the best method of surveying for arriving at a really good survey, he was surprised that the chain was used at all except for the roughest work. The chain ought to be relegated to the top shelf, where it could not be got at easily. The steel band was, he thought, the only proper method; it required more skill in handling, but for intricate surveys there was nothing like it.

Lieut.-Col. Sir G. Leach added some further observations in reference to the necessity of solidity in some of these instruments. He gave the opinion of Sir G. Airey, Astronomer Royal, as to a 2-ft. circle theodolite, which could not be got to do good work. According to Sir G. Airey, it was a perfectly sound instrument, but it was not solid enough, and that it would never be got to do good work until stronger supports were put in. This advice was acted upon, and the theodolite then did good work. One of the features which characterised the instruments produced by Sir George Airey was their solidity; he did away with all brasswork where he could, and put in cast-iron, and got rid of as much spring as he could. It was desirable to make these instruments as low and as rigid as possible.

The vote of thanks having been heartily agreed to,

Mr. Walmisley, in reply, said that these new instruments were brought to their notice from time to time; they were ingenious and they possessed merits as time economisers. There was no doubt that abroad some of them would be more useful for approximate work than in this country. As to the steel band, he was perfectly well aware of its accuracy, but the chain commended itself to him in some cases. For instance, if they crossed a road where traffic went on, a heavy iron chain would allow a cart to go over without effect, and a chain was not so likely to snap as a steel band. But there were improved arrangements for winding up the steel band, and its merits for accurate work could not be denied.

It was announced that the next meeting would be held on January 29, when Mr. F. Marshall, K.C., would read a paper on "The Value of Machinery for the Purposes of Rating."

The meeting then adjourned.

WAR MEMORIAL, BEAULY, N.B.—A monument has been erected in the square of Beauly in memory of the men of Lovat's Scouts who were killed or died in the Boer war. The memorial was designed by the Hon. Evelard Stourton.

## *ARCHITECTURAL SOCIETIES.*

SHEFFIELD SOCIETY OF ARCHITECTS.—The monthly meeting of the Sheffield Society of Architects and Surveyors was held on the 11th inst. in the Lecture Hall of the Literary and Philosophical Society, Leopold-street. Mr. Joseph Smith occupied the chair in the absence of the President. Dr. H. Scurfield Medical Officer of Health for the city, delivered a lecture dealing with "The Advantages and Disadvantages of Mechanical Ventilation." Some of his points were:—"The air ordinarily contains about four parts per 10,000 of carbonic acid, and it has been found that when the air of a room occupied by human beings and not artificially lit contains as much as six parts per 10,000 of carbonic acid it begins to smell. When the carbonic acid in such a room reaches eight parts per 10,000 the air begins to be distinctly foul. An average human being gives off 6 cubic ft. of carbonic acid per hour. He will therefore load 1,000 cubic ft. of air to the extent of six parts per 10,000 in an hour, and 3,000 cubic ft. to the extent of two parts per 10,000. As four parts per 10,000 is the amount normally present in the atmosphere, and six parts per 10,000 is the limit of good ventilation, it follows that 3,000 cubic ft. of fresh air per hour must be supplied for each occupant in order to maintain the ventilation of a room efficiently. If the room is lighted by gas, oil, or candles, the amount of carbonic acid cannot be taken as an index of the impurity caused by human occupation. A gas burner, for example, which burns 3 cubic ft. of gas per hour forms 1½ cubic ft. of carbonic acid, or more than that given off by two persons. The problem to be achieved by good ventilation is to provide 3,000 cubic ft. per hour of fresh air for each individual. If each individual has a cubic space of 1,000 cubic ft. the air must be changed three times in the hour, if 150 ft. only the air must be changed twenty times in the hour. It is generally agreed that in this country during the colder months a change of air more frequently than about three times in the hour cannot be borne unless the incoming air is warmed. Mechanical ventilation has been introduced, on account of the difficulty of changing the air of a building sufficiently often to maintain good ventilation without intolerable draughts, by ordinary means, such as open fires, and the provision of inlet and outlet shafts and openings through which the air is moved by differences in temperature, the aspirating action of the wind, and the law of the diffusion of gases. Extraction fans also answer satisfactorily for single rooms, such as restaurants, hotel dining-rooms, etc. I think that churches (which, by the way, are apparently not supposed to require ventilation) and public halls might readily be ventilated by the provision of extraction fans and plenty of inlets equipped with radiators for warming the incoming air." In a summary of the lecture Dr. Scurfield says he thinks that where the cubic space allowance is small, as in our elementary schools with 120 to 150 cubic ft., mechanical ventilation is the only system which is capable of giving really good results as regards the purity of the air; but that where the cubic space allowance is large, as in hospitals with 2,000 cubic ft., its introduction is probably undesirable. In the second place, he thinks that if mechanical ventilation is decided upon for a building the fact ought to be realised that by its means the air of the building can be changed at least twice as frequently as by other methods, and that its introduction is equivalent to doubling the cubic space of the building, and that it is therefore well worth while to pay for as perfect an installation as can be obtained. In the third place, the contract as to what air changes are to be accomplished by the method should be carefully drawn, and after the work is completed careful tests by chemical analyses of the air and the anemometer should be made in order to ascertain that the terms of the contract have been fulfilled. In the fourth place, the person responsible for the management of the building should thoroughly understand what are the capabilities of the system, so that it may not be expected to perform impossibilities. For example, mechanical ventilation will keep the air in the classrooms of an elementary school good for a matter of eighty minutes, but if the classrooms are not emptied and filled with fresh air at the breaks the air in them will be just as bad at the end of the morning or afternoon school as the air in the classrooms of a naturally ventilated school just before the break.—At the conclusion a hearty vote of thanks was accorded, on the proposal of Mr. E. M. Gibbs, seconded by Mr. J. J. Bingham, and supported by Messrs. J. B. Mitchell-Withers, H. L. Paterson, T. Winder, and the Chairman.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY. — At the rooms of this Society on Thursday, the 11th inst., a paper was read on "The Better Housing of the Artisan Population" by Mr. W. P. Rylatt, who won the prize for an essay on the subject. Mr. Rylatt said: "The question of the housing of our artisan population is one of the greatest problems of the present day. Ever since 1851, when the attention of Parliament was first drawn to the disgraceful state of the houses of the artisan classes in London and in other large cities, Acts have been passed and measures taken to improve the condition of these dwellings. A very great fact in the health of the people, physical and mental, is a cheeriness of surroundings and a pleasant outlook obtained by providing plenty of open spaces, laid out as gardens, such as is carried out on the Millbank estate in London. Many difficulties are met with in carrying out schemes of workmen's dwellings in large cities, one of which is the high price of land, and another is the increase, of recent years, of the cost of materials and labour. Every advantage should be taken of cheaper methods of building, and perhaps a more reasonable application of the by-laws by the local authorities would allow more latitude in this respect. In a workmen's dwelling scheme everything should be cheap and simple, consistent with good workmanship. The most economical plan of tenement buildings is a parallelogram, two rooms deep, and with a common staircase, everything, as far as possible, fire-resisting. All staircases, landings, and passages should be reduced to a minimum. To bring a little brightness into the lives of the tenants the buildings might be planned round a paved court or quadrangle, opening into a street by one or more archways, and laid out with flower-beds. This court might be overlooked from balconies on each floor. Much might be done by providing cheaper and quicker means of transit by electric car and railway to enable the better class of artisan to live in the suburbs, and so leave more dwellings in the congested parts of the city for the lower class of workman. In providing dwellings for the artisan class private enterprise has signally failed, and there are acres and acres of jerry-built property in the suburbs, which probably in a few years will fall into a condition almost as bad as that of the wretched dwellings now being cleared away in our slums. The problem of the housing of the agricultural labourer in the country naturally does not attain the vast proportions of the same problem in the city. In this case a cottage, costing from 100*l.* to 130*l.*, everything included, is needed. To effect this, purely local materials and labour should be utilised as far as possible."

MANCHESTER SOCIETY OF ARCHITECTS.—The seventh meeting of the students of this Society was presided over by Mr. Charles Potter, who, after a few preliminary remarks, called upon Mr. Gerald Solomons to move the following resolution:—"That the revival of the ancient styles of architecture be encouraged by architects." The resolution as above expressed failed to be carried, for it was held that the Renaissance style and other styles in an analogous state were the development of styles, and not the revival of them, the "revival" at this meeting being taken to mean (as literally it does) the actual reusing of the styles in their purest state, showing no innovations, all proportions being equal, and applied as it was applied when discovered. One speaker referred to the Renaissance as being an ancient style, which remark was interrupted by another speaker, who called the ancient styles only such as Classic and Egyptian, and the Chairman, in endeavouring to save the remarks of the former, included both in the class by constituting it as follows:—"Ancient architecture is other than modern." Thus both speakers were allowed to proceed. In this debate St. Paul's Cathedral was held to be in style "a

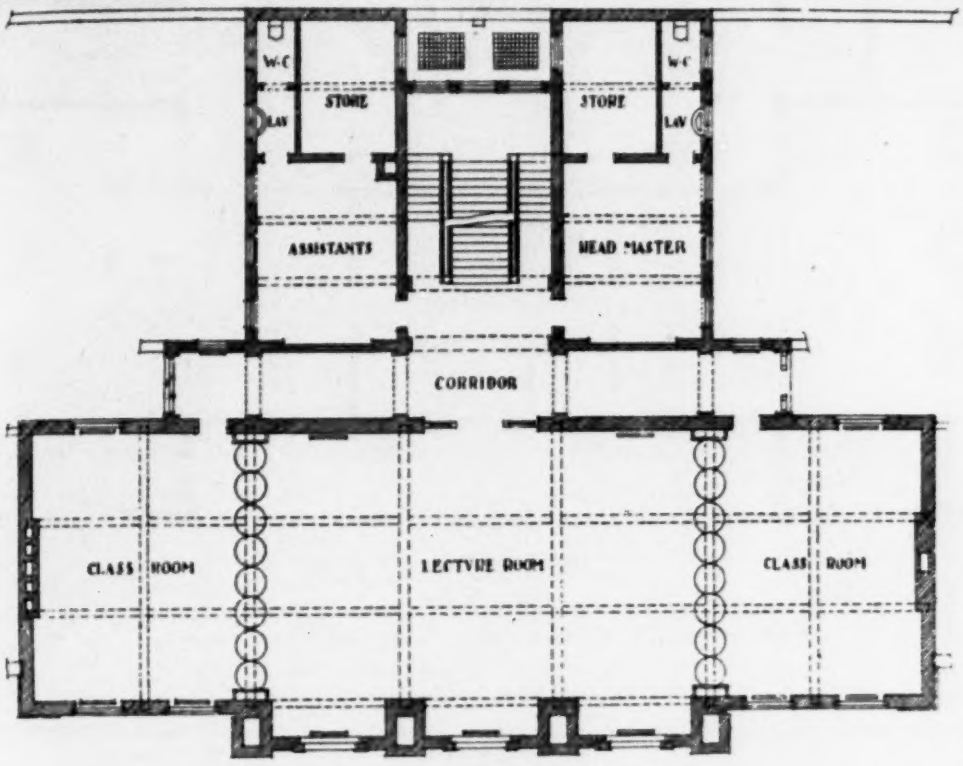
development of the Classic architecture," and not, as is generally expressed, a revival of Classic architecture.

## Fifty Years Ago.

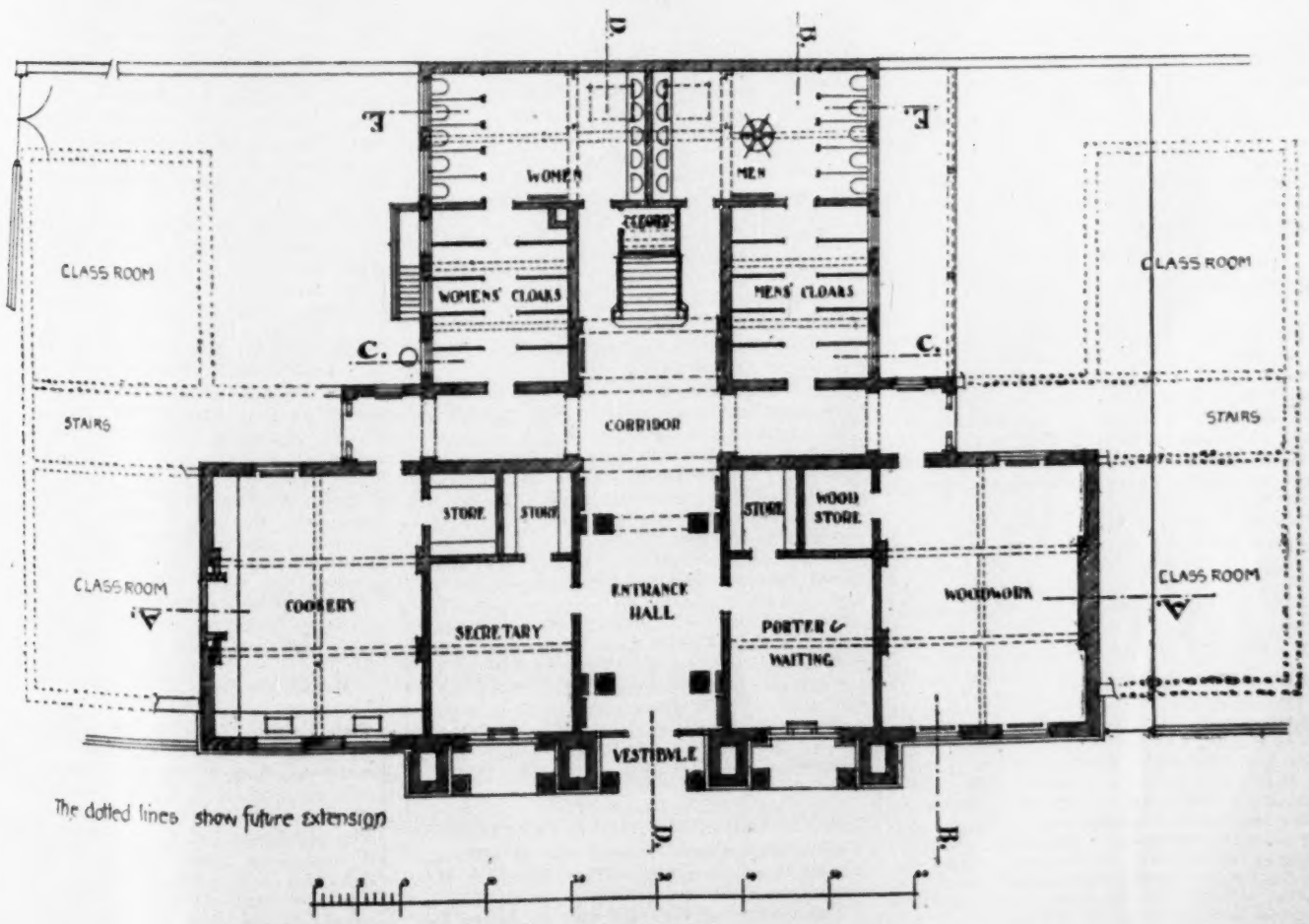
FROM A LETTER IN THE *Builder* OF JANUARY 19, 1856.

IF there exist fools enough in the world to give work to those who do not possess even elementary knowledge, a diploma system would not prevent them from obtaining it. It might, perhaps, induce those to study who have not yet practised, in order that they might pass the examination with honour. It would, perhaps, ensure a certain amount of practical knowledge in the coming generation, but would it increase talent by offering it a more enticing remuneration? In my opinion it would not, by reason of its proving no check upon the influx of new members into the profession. Some would say, establish a system of collegiate education, and raise the qualifications to a higher standard; but there are evils inseparable to the system. You compel young men to go through a course of training which is as likely to be bad as it is to be good, and is certain to be expensive. The management may also, through interest or routine, fall into the hands of incompetent persons, and thus become a repetition, on a small scale, of Government imbecility and incapacity. It is a principle becoming day by day more significant, that every institute should stand on its own merits as a basis, and be self-sustaining. Let architectural education be no exception to the rule. Establish colleges, but let them depend upon the support of the profession. If they are required, they will answer; if not, they will soon be numbered with the things that were.

After considering the question of voluntary

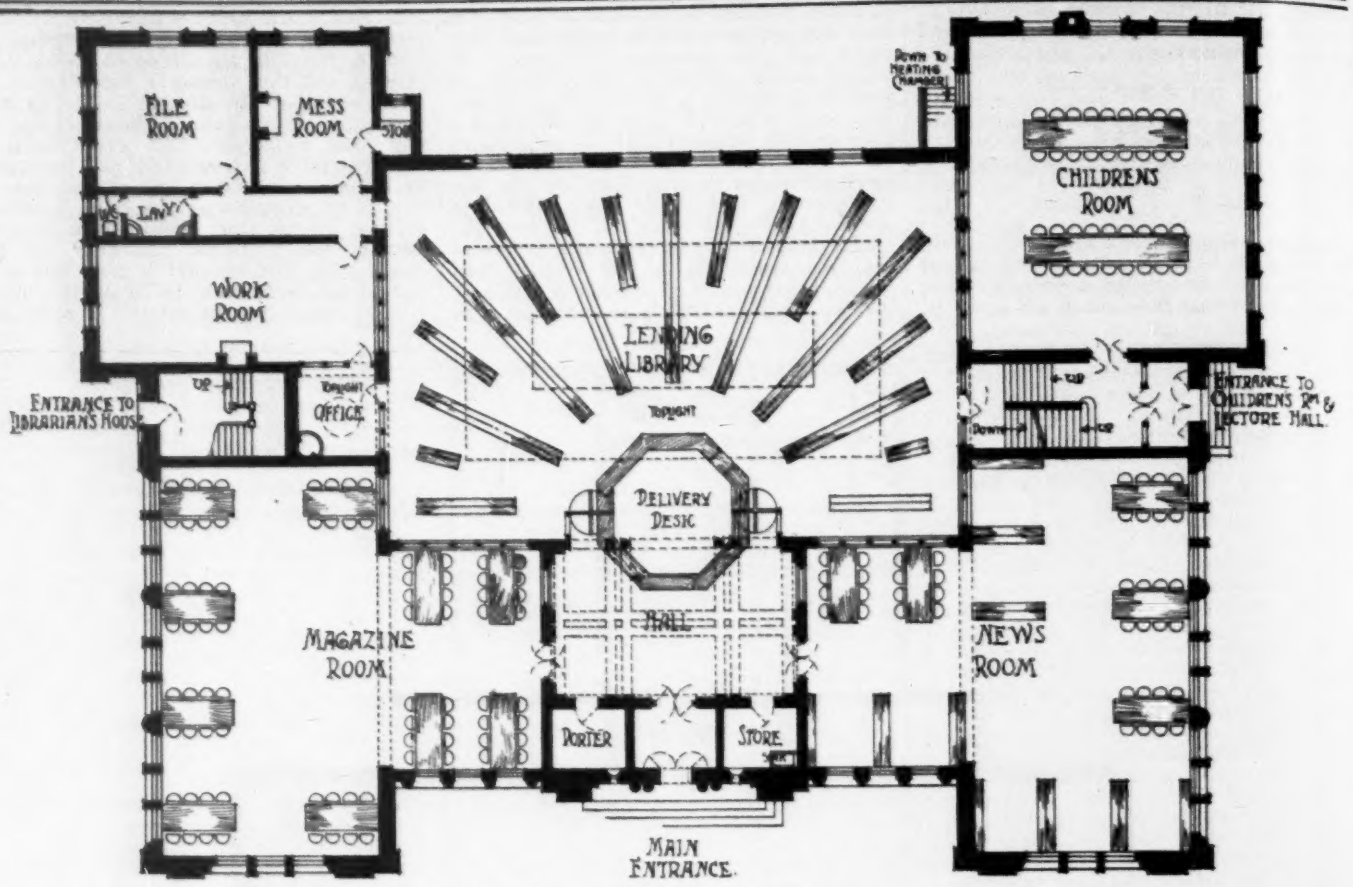



Upper Plan.




Ground Plan.

*Technical Institute, Rochester. Plans.* (See page 68.)




♡ GROUND PLAN ♡

SCALE OF FEET

10 5 0 10 20 30 40 50 60 70

*Premiated Design for Public Library, Herne Hill.*

examination in all its bearings, the only conclusion I can come to is, that it will be impossible for it to become a moral necessity, that the feeling of the profession will be against it, from the extra trouble and expense incurred, and the dislike of many to let the decision of the great question of their lives, "whether they shall practise or not," rest with any but themselves; that the public, finding many able men among those who have no diploma, will encourage them in preference even to those possessed of one—for the English people, above all things, hold in abhorrence any attempt at monopoly, which the movement would undoubtedly be considered to portend.

## PRIZE DRAWINGS BY STUDENTS OF THE INSTITUTE.

To prevent misunderstanding, we think it as well to say beforehand that we are always glad to publish the designs which obtain the Soane Medallion, the Tite Prize, and the Grissell Medal; a statement which may be taken as a standing notice. On several former occasions winners of prizes have expressed their regret at not having their designs publisned in our pages, having promised them elsewhere, apparently through not being aware that we should be willing to publish them. We have always been glad to do so; but students ought hardly to expect that this journal should take part in a kind of scramble to see who could get their consent first.

Technical College Architectural Craftsmen's Society.—At the usual fortnightly meeting of this Society, held in the Technical College on the 12th inst., Mr. Colin Sinclair presiding, Prof. F. O. Bower delivered a lecture on "Dry Rot." The nature of the fungus, its growth in dead wood under favourable atmospheric and chemical conditions, the germination of the spores, which are extremely minute and produced in vast numbers, the process of ferment, and the characteristics of timber attacked by the disease were described in detail and illustrated by lantern views. The Professor thereafter explained the most likely causes of growth, also the precautions to be observed to ensure its prevention and elimination.

# Illustrations.

## SCULPTURE, CENTRAL LIBRARY, BRISTOL.

THIS panel is one of three on the exterior of the building; the figures, which are life-size, represent King Alfred, four chroniclers, and two wandering bards. Mr. Charles Pibworth is the sculptor.

Mr. Pibworth gives us the names of his characters as follows, taking the figures from left to right of the illustration:—

Cynwulf (wandering bard); Nennius (historian); Gildas (historian); King Alfred; William of Malmesbury (historian); Florence of Worcester (historian); Wace (Norman minstrel).

## DOORWAY, S. RENIERI CHAPEL, PISA CATHEDRAL.

This small doorway, constructed entirely of marble, in the Crociera di San Renieri of Pisa Cathedral (forming the south transept), is upon the north-west side of the transept, and upon the opposite side to the entrance containing the famous bronze doors of twenty-four compartments which escaped the fire of October 15, 1596.

It is probable that the doorway here illustrated, having been greatly damaged by the fire mentioned above, has been reconstructed with the original portions. Other similar doors in the Duomo show caps upon either side under the lintel. The mouldings are typical of Greek influence. The figure over the doorway is evidently intended to represent one of the Evangelists. The door itself is of sheet iron and bronze toned to a delightful colour by age. L. U. G.

## ROCHESTER TECHNICAL INSTITUTE.

This design was selected out of 113 submitted in an open competition in which Mr. Baggallay acted as assessor.

The motive of the plan was to design the present requirements in such a way that the extensions required could be added in a simple manner, interrupting the work as little as possible, and leaving both the present and ultimate building with a complete appearance.

The road in front is to be private to the Institute, Eastgate House Museum, and the future library. The building is designed to harmonise with Eastgate House, though the type chosen is not Domestic Elizabethan, a style considered by the architects to be unsuitable for modern school requirements. The school will be devoted mainly to art teaching, and the special rooms for that purpose are placed on the second floor.

The materials to be used are red and stock bricks, with Ancaster stone dressings, and tiles for the roof.

Tenders will be received this month, and it is expected that the building will be completed in a year.

The architects are Messrs. S. B. Russell & T. Edwin Cooper.

## PREMIATED DESIGN FOR PUBLIC LIBRARY, HERNE HILL.

This design, by Mr. Thomas Wallis, is one of six that were premiated in the competition, though it was not the one selected for execution.

The planning of the Library was specified in the instructions to be on the Free Access system, and this design was planned for that system, though we understand that it was abandoned in the actual erection of the Library.

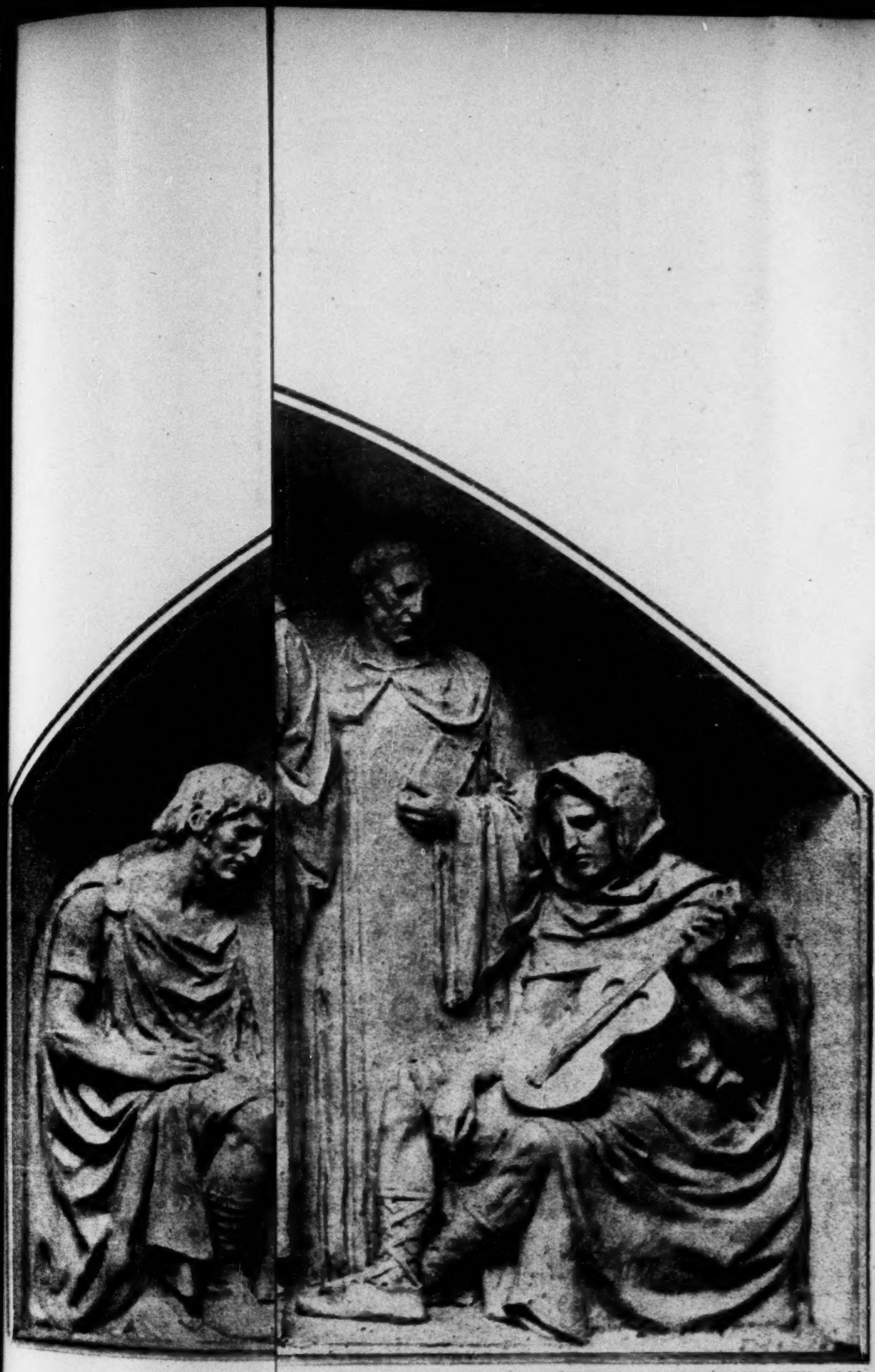
The buildings were to be of red brick, with terra-cotta facings, roofed with green slates; the cost not to exceed 10,000*l*.

## MEXBOROUGH HOUSE, DOVER-STREET.

This building is erected on the site of the town house of Lord Mexborough, and consists of two large blocks of buildings, having frontages of about 40 ft. to Dover-street and Berkeley-street.

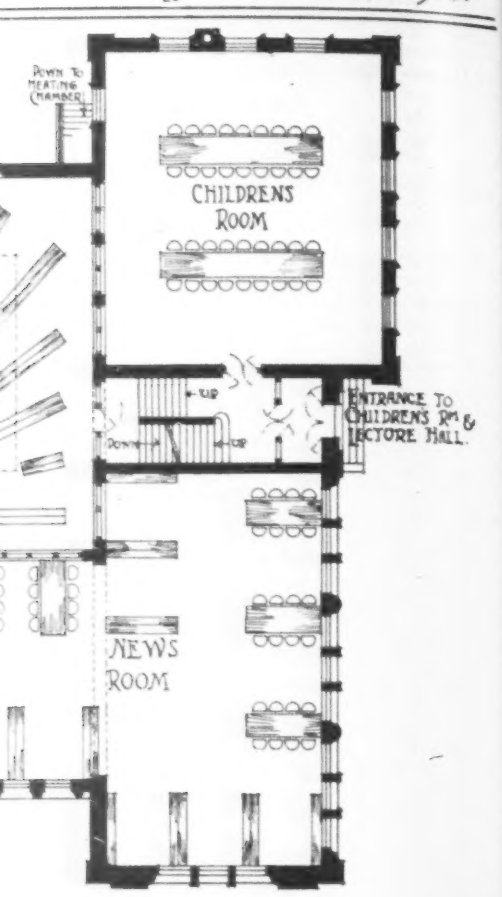
The old house had some fine carved doors and over-doors, dado and other panelling, which have been preserved.

The new buildings will be known as Mexborough House, and are planned as residential flats on the upper floors, each flat consisting of hall, sitting-room, three bedrooms, and bathroom. The service will be from a common kitchen, and the tenants will



"INK-PHOTO" SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

SCULPTOR.




Hall.

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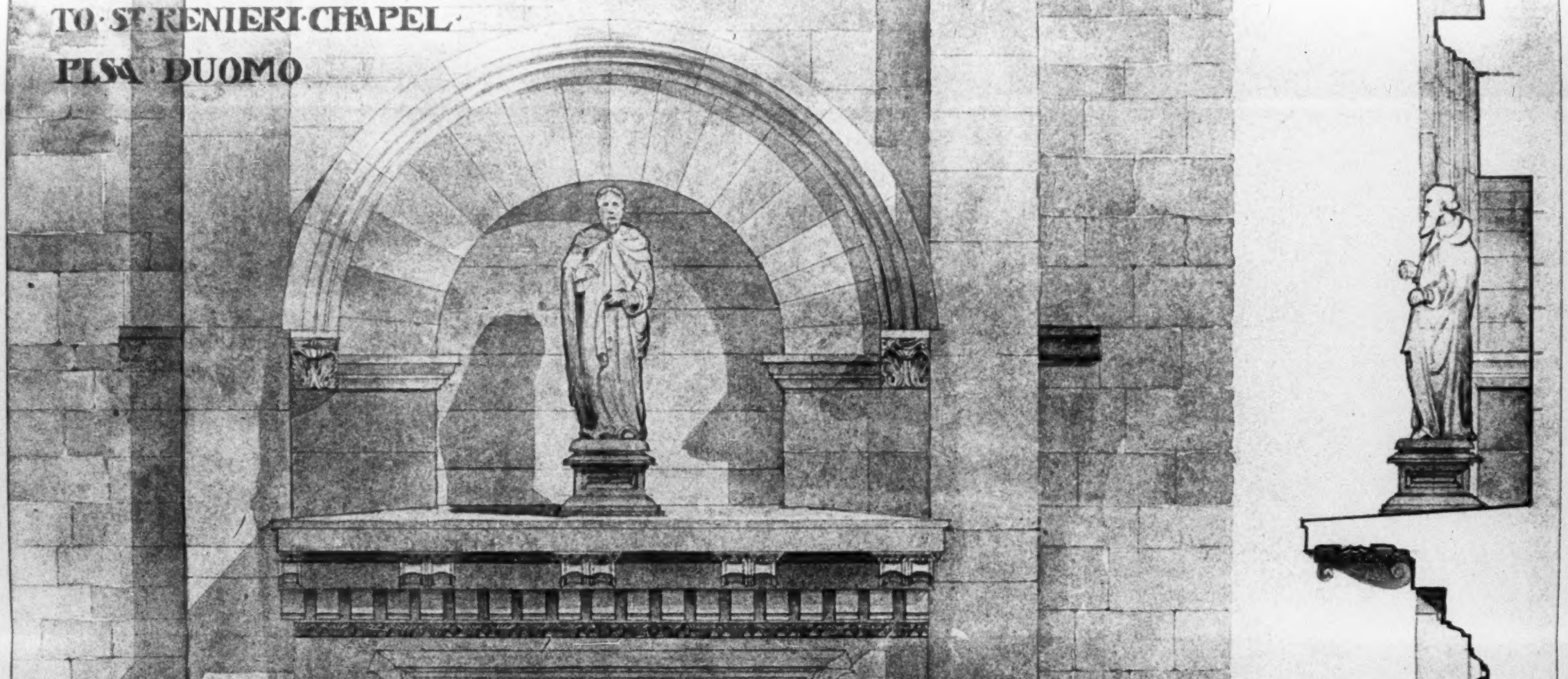
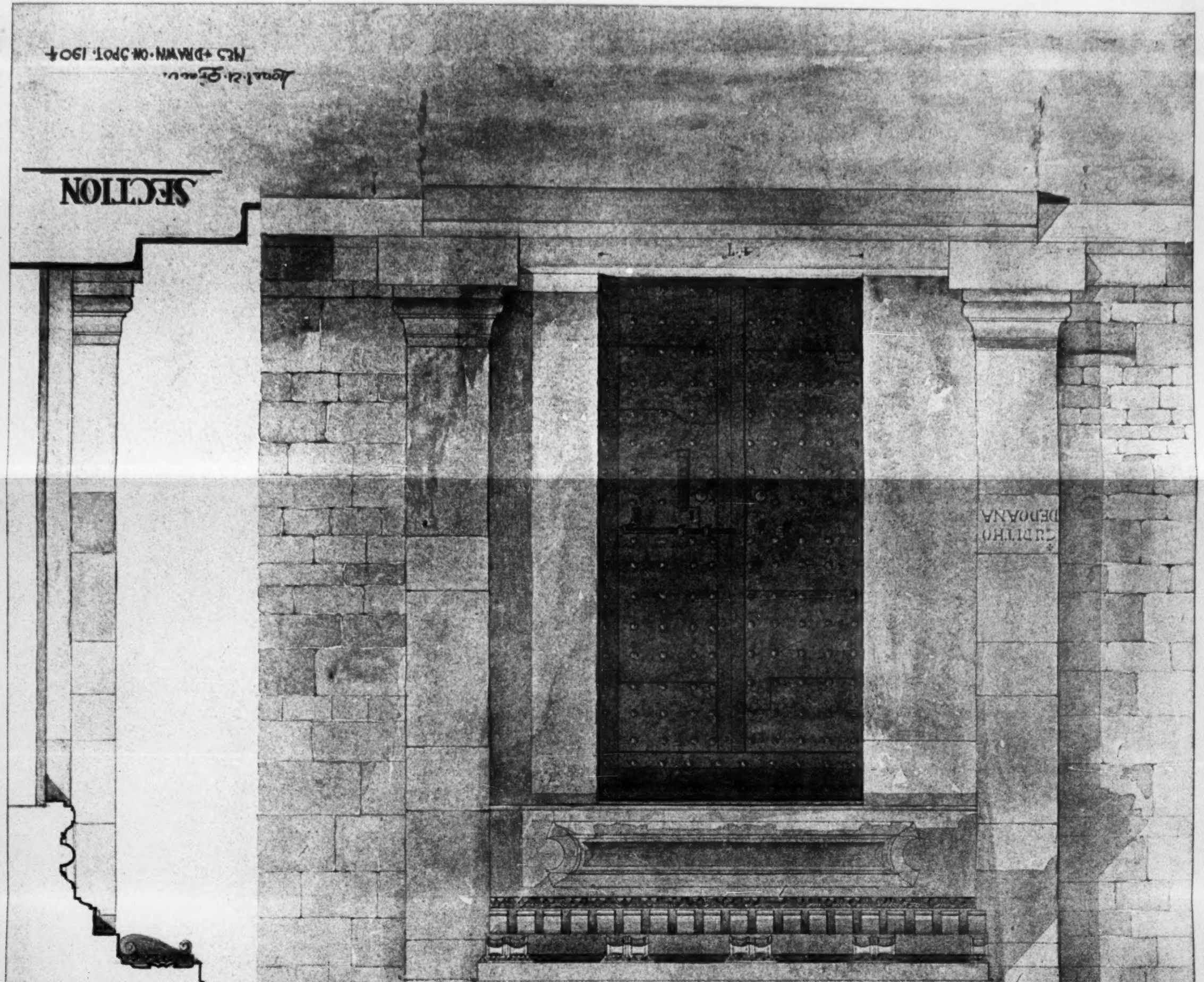
SCULPTURE PANEL ON EXTERIOR OF NEW CEN

INK PHOTO (PRAGUE & C° LT° 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

ERIOR OF NEW CENTRAL LIBRARY, BRISTOL.—Mr. Charles Pibworth, Sculptor.

SCALE·DETAIL·OF·DOORWAY
TO·ST·RENIERI·CHAPEL·
PISA·DUOMO




SECTION

CITY OF ROCHEST

# HESTER TECHNICAL INSTITVTE 1906

RVSSELL & COOPER FF·R·I·B·A·

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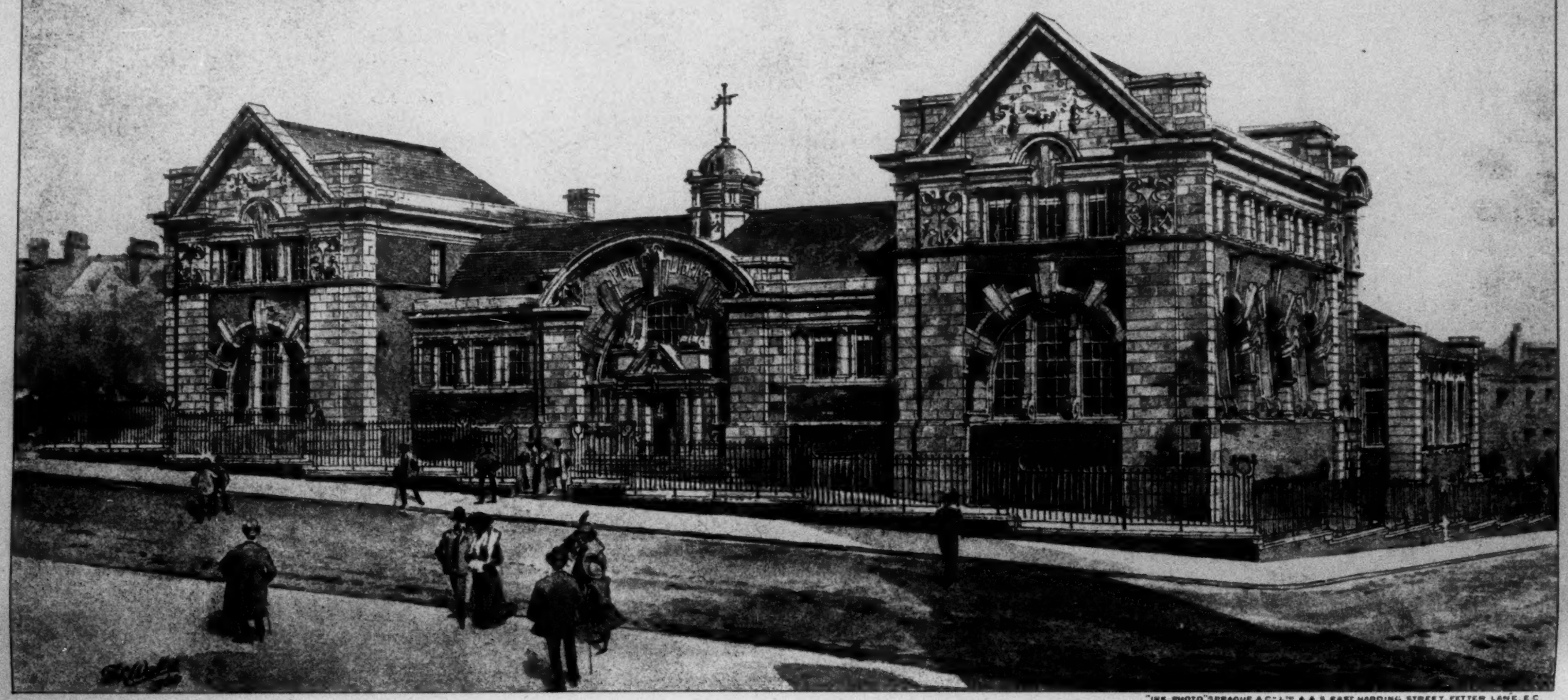
# HERNE HILL PUBLIC LIBRARY

## PREMIATED DESIGN



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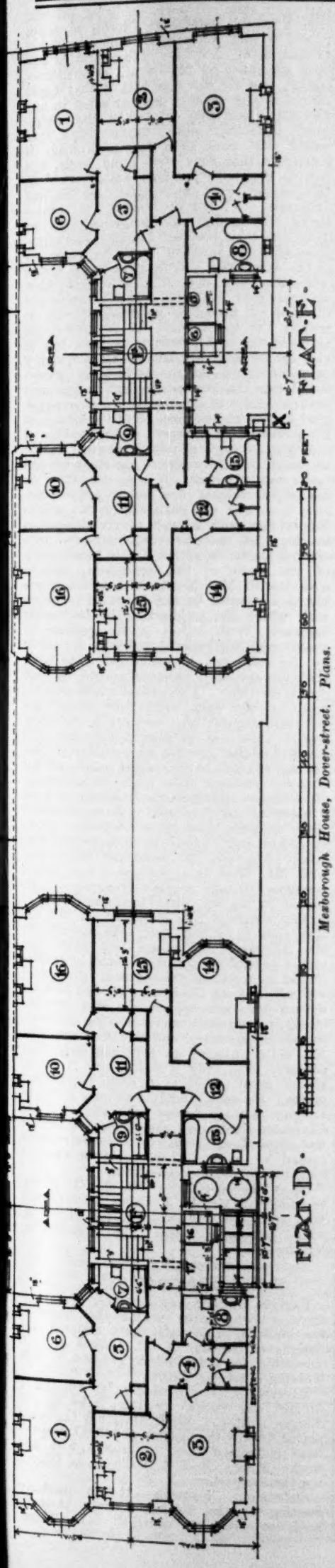
MEXBOROUGH HOUSE, DOVER STREET.—Mr. James S. Gibson, F.R.I.B.A., Architect




be supplied with all meals on a fixed tariff, and also with all domestic services.

The frontage to Dover-street is designed for business premises on the ground floor, now occupied by the Well Fire Company, and having unpolished grey granite to the first floor level and Portland stone above, with metal casements to the window openings.

The frontage to Berkeley-street is treated with red brick and Portland stone dressings.

The whole of the buildings are of fire-resisting construction, and the finishings throughout are of first-class materials.

The contractor is Mr. James Carmichael, and Mr. P. Watkins has acted as clerk of works.

JAMES S. GIBSON.

## THE QUANTITY SURVEYORS' ASSOCIATION.

A MEETING of the Quantity Surveyors' Association (Incorporated) was held on Wednesday in the "Chinese Room," Holborn Restaurant, when the adjourned discussion was resumed on the paper read by Mr. F. B. Hollis, on December 6 last, entitled "Some thoughts on the Quantity Surveyor and his Relation to the Building Owner, the Architect, and the Builder."*

The chair was occupied by Mr. A. J. Gate, Vice-President.

The minutes having been read and confirmed, Mr. F. B. Hollis, Hon. Secretary, read some correspondence arising out of his paper.

Mr. H. Smith (London) wrote saying that there were two points to which he would call attention. Mr. Hollis, in his definitions of "Quantity Surveyor," mentioned that the quantity surveyor should have intimate acquaintance with the law of dilapidations, etc., light and air cases, and value of property for mortgage and other purposes. He (Mr. Smith) agreed that they should have intimate and full acquaintance of such matters, but, from personal experience, he found that a "quantity surveyor" had but very little standing in the eyes of the law on these matters. He had been engaged upon very many cases of such description to give expert evidence, and he had found that nothing but the term "building surveyor" would satisfy the law that one knew what one was talking about and was capable of giving expert evidence; and, although a quantity surveyor might be fully capable and able to give first-class evidence, he was discredited because he was a quantity surveyor and not a building surveyor, and in many instances of important cases he had been engaged upon he had been compelled to use the term "building surveyor" to get any importance attached to his evidence. In the question as to whether quantities should form part of the contract, he said "Yes, providing that the quantities, being a part of the contract, did not invalidate the responsibility of the quantity surveyor for errors." He did considerable work in both private and public buildings, and he could say that in not one solitary case had the quantity surveyor's work been allowed to form part of the contract; and why? simply because it was thought—and somewhat truly under the present conditions—that if the quantities formed part of the contract it invalidated the question of responsibility as to the accuracy. One of the many reasons he had had given was that "if the quantity surveyor's work be accepted as part of the contract, then the provisions usually included by the architects for 'contingencies and extra work' cover also any omission, if any, on the part of the quantity surveyor." How many architects carried out a job of any sort without the "contingency provision"? Not many, he feared, and if not put into actual lump sum amount they insisted on having an item measured for provision of brickwork or digging and concrete, etc.; and why? simply as a cover to allow for any matter which, according to the plans and specification, might require altering or adjusting as the work proceeded, and they liked those provisions entirely for their own use. He admitted that it was desirable in the practice of an architect, where alteration works or uncertain party-wall works, etc., occurred to include something to deal with to cover matters that arose when old work was exposed, as that usually happened where one had so many to satisfy where more than one person was interested. He knew that this question on the point of provisions was a very delicate one, and until that point could be dealt with to the architects' satisfaction they would, he feared, not give the quantity surveyor any recognised position in the contract. He used the architect's name in this matter because he was the man that prepared the contract on behalf of the employer. Another serious clause in quantities which did not tend to improve matters, and which was often used by supposed "qualified men," was "that the quantities have been prepared with care and accuracy as far as possible to obtain same, but the contractor must satisfy himself as to whether they are accurate or not before he signs the contract, as no claim will afterwards be considered if any error or omission be found." It was this sort of clause that made the contractor dissatisfied and the employer suspicious, and especially when they had to pay full price to a man who was uncertain whether he was competent or not. That sort of quantity surveyor was not the man to head his bills of quantities thus: "That these bills have been carefully prepared and are guaranteed correct by the quantity surveyor." He had spoken to many architects as to why they object to quantities forming part of the contract, and the answer invariably was: "No thank you; we get quite enough trouble without giving ourselves more." As to the employment of the quantity surveyor direct by the employer, he was of opinion that the employment direct would be a great mistake both as to the surveyor's side of the question and to the architect's side. It certainly meant "chiselling" down prices, and allowed of incompetent men being pushed on to the architect, and he need not discourse on the many drawbacks that would arise to those who were experienced in the matter of the present competitive rules and ways of getting work. Certainly one question the employers would be sure to insist on was that no fees ought to be paid to the surveyor till the job is complete and account settled to the building owner's satisfaction. What a time for the poor quantity surveyor!

Mr. Acheson Ferguson (Belfast) said he quite agreed with Mr. Hollis's definition of the relations of the quantity surveyor to the architect and the building owner, which must in reality mean that the latter was the principal and the former his agent. Therefore, it followed, as a matter of course, that if the principal, or the building owner, allowed the bill of quantities to form part of the contract he fully admitted his responsibility, and the Association's clause 13 did no harm. This reasonable course was not adopted in many cases owing to the principal, or building owner, refusing to allow the quantities "to form part of the contract," thereby shifting his responsibility to the shoulders of the building contractor, who in turn passed it over to the quantity surveyor. At this stage clause 13 became operative, and, if acted on, would not only compel the quantity surveyor to take a risk other than that laid down by law, but also to pay the debt of his principal for a shortage in quantities, which he, the principal, alone should pay for, as he alone derived the benefit of the same; surely there was something wrong in a clause that would operate so unjustly. The remedy he suggested was to amend clause 13 to read as follows:—"Any member of the Association who shall supply bills of quantities may hold himself responsible for their accuracy as a whole, or in cases where the quantities are not intended to form part of the contract he may insert an item in same to cover any risk the building contractor is obliged to take by having to accept the bill of quantities to be correct as a whole." If this were adopted the building contractor could protect himself by an insurance policy, and the insurance company could protect themselves by stipulating that the bill of quantities should be prepared by a member of the Association. He thought that every reasonable effort should be made to get a charter as soon as possible, and the amendment of clause 13 would, in his opinion, clear the way.

Mr. A. Laurence Cox, of Manchester, said he was of opinion that a quantity surveyor should be designated by his true title and not merely as a "surveyor." The house agent, amongst others, was much too

* See our issue for December 9 for a report of the meeting.

fond of annexing this title. The crying abuse of the use of the title "quantity surveyor" by men who issued quantities containing such choice items as those quoted in the paper called for serious and immediate consideration. He thought it desirable that the Association should continue in the good work of educating the public by the publication and discussion of papers bearing upon the peculiar intricacies and arduous nature of the work of quantity surveyor and the necessity, as a matter of justice between owner and contractor, for the work to be solely in the hands of skilled and qualified practitioners. He thought that they would all be of opinion that the profession should be "protected" from unskilled and unscrupulous competition. The best form of protection would be some form of compulsory registration, and he should be glad to hear that the executive had this goal before them.

Mr. B. Laine Pearson said, as to the latter part of the fifth section of the definition of a quantity surveyor, which states that he should be a man having an acquaintance with the value of property for mortgage or other purposes, this appeared to be more the business of a valuation surveyor or house agent, as, although there were many quantity surveyors in London who occasionally did this kind of work, he believed by far the greater number did not engage in it, and rightly so, as a quantity surveyor proper was a man of detail rather than of piecemeal valuation. Second, as to the difference in modes of measurement of London, the Midlands, and the North, as a man who had had considerable experience in measuring up works, and also of estimating, and bills of quantities in a great many different towns in the North and Midlands, he had found that, with a few exceptions, their chief systems were a want of system, practically no two men following the same procedure, and all having one system—viz., that of shortening detail. Even in cities like Manchester and Leeds, where there were printed modes of measurement agreed between the architects and the builder, each man followed his own method, and, although there had recently been a lot said about standardising mode of measurement, he was afraid it would have to take the form of perfecting the London system only, as on the one hand the men who prepared quantities in the North and Midlands would mostly be unwilling to change, and on the other hand there were only a few improvements that could be culled from their practice, the chief of them being the running of extra double course at eaves and cutting and waste in slating and tiling, and the number of tees in iron and copper pipes. In view of a probable perfecting of the London system among the members of the Association, he mentioned a few of the items it seemed to him desirable to revise—*i.e.*, concrete in deep trenches should have the distance below surface stated; drains should be stated as digging and laying commencing at a certain depth below surface; brick facings to external and internal angles, also to reveals to doors and windows, should be measured per foot run, stating width and girth, and in the case of external angles making a deduction of the girth of the quoin. Brick arches sadly need revision, so as to be able to fix an accurate price. Wrot stonework should, in his opinion, always have the labours measured separately, and in the case of some of the millstone grits, which were not usually sawn, should have all beds and joints measured, and those of these latter that were sawn should have the rough stone measured run.

Mr. H. J. West having made a few remarks,

Mr. Theo P. Pietersen said, as to the quantities forming part of the contract, he thought that it would be an excellent thing if such a course were to obtain that all quantities should form part of the contract. He was quite sure that all errors were not made by qualified men. Slight clerical errors there might be for which he thought it would be most unjust to hold a surveyor responsible, and, although this clashed with clause 13 of the articles of association, still he could not help thinking that on the whole it would be beneficial to the profession if quantities were always made part of the contract. He knew of one public body who made quantities part of the contract, and they stipulated that any errors made by the surveyor should be paid for by him, and *vice versâ*. Such an arrangement got over the difficulty of, at all events, the possible charge that a surveyor will take the quantities out more fully in order to increase his fees.

Mr. B. S. Smith said he had seen it suggested that quantities should be standardised.

The Chairman said that standardising quantities was impossible. If an immense volume should be prepared, with every item possible in it, it would be a little bigger than the "Encyclopædia Britannica."

Mr. E. A. Wylie said that he believed that bills of quantities should form part of the contract. He also agreed with clause 13 that the quantity surveyor should guarantee his quantities.

Mr. T. W. Biggs having spoken on various points dealt with by Mr. Hollis,

The Chairman, in putting the vote of thanks to the meeting, said that Mr. Hollis suggested that the first, second, and third requisite for the quantity surveyor was accuracy. He should be sorry if that was all; the really successful surveyor should be a good deal more than accurate. The first thing he required was brains, the second industry, and the third tact. A man with those three qualifications would, if he exercised them all, have a reasonable hope of getting near enough to the top of his profession not to have to carry out work at some of the prices which were now offered. A man with accuracy only, remained a drudge all his life.

Mr. Hollis, in the course of his reply, said that the principal points touched upon by the gentlemen who had spoken were briefly:—Whether or not the bills of quantities should form part of the contract; clause 13 of the Association; and uniformity of fees. As to the first point, Mr. Cross, who opened the discussion, contended that such a course was an evil one, inasmuch as it tended to lower the status of the quantity surveyor, and to make him careless as to whether his bill was a good one or otherwise. He (the speaker) would not go so far as his friend had in his assertion, as he thought that the production of one bad, or even indifferent bill, would do a quantity surveyor more harm than twenty good ones could neutralise, in the opinion of the employer or the architect for whom he was working. He was still of the opinion that making the bills part of the contract would tend to a more thorough consideration of doubtful points in the specification and plans, as with the bills part of the contract they would be even more carefully prepared than at present, seeing that so much more depended upon their accuracy. Now, as to clause 13, Mr. C. John Mann demurred very much to going beyond the law of the land in the matter of a quantity surveyor being made liable, or rather making himself liable, for the inaccuracies in his bill of quantities. But this idea was of the "Bogey" description, and must, in a great measure, be due to a mistaken conception of the law as it at present stands in its relation to a quantity surveyor's liability. Did not the clause merely emphasise the law? As he understood the law in its relation to this, it was that the party who paid for the bill of quantities had a claim in common law against the surveyor who prepared it if it contained inaccuracies directly due to negligence. That was all that they as an Association insisted upon the offender doing, if the case was brought before the Association officially, and, of course, the only authority they possessed to compel the person complained of making the necessary restitution was the threat of expulsion in the event of his non-compliance with such rule, after it had been duly gone into by the Association. Mr. Sanders thought that the quantity surveyor's liability should be limited to the amount of his fees in the matter in dispute. This, of course, was opening up the whole question of a surveyor's liability, and he could only say that if such an amendment to the Articles of Association was duly proposed by a member that the machinery existed for ascertaining the wishes of the majority of the members upon the question. At present he knew of no such general feeling amongst the Association. As to a schedule of fees for any particular class of work, public or private, from a humble cottage to a lordly mansion, it was a most delicate and difficult subject to deal with. A "Fees" sub-committee had been appointed by the Council of the Association, and he was sure that if they could formulate any scale of fees, or assist in any way the object they all had in view as regards this, they would do so. Some men would take work at a fee which made it impossible that good work could result, but how to stop such practices was a very difficult matter even to suggest, not to say undertake. A district council, in advertising for tenders for preparing bills of quantities for a proposed building, had stipulated that the surveyor should be a member of the Association. When more public bodies were like this one in that respect then uniformity of fees came within a measurable distance of becoming practicable. As to writing the specification, he considered the architect the best person to do this, but he also agreed with Mr. Mann that a quantity surveyor could do so, perhaps in greater detail from his dimensions, and he was sure that no member of the Association but would be glad to give his architect all the assistance in his power in this respect. The question of supplying a copy of the dimensions to the successful firm in tendering for the work had been touched upon. It was one thing to answer the request of a builder for information upon any one particular point and to supply him with a copy of the dimensions bearing upon that individual item, and quite another matter to permit him to have a copy of the whole of the dimensions, and he agreed with Mr. Mann that such a course placed a weapon in the hands of a person with which the architect might be unduly harassed. With regard to the question of quantities being ordered and paid for direct by the employer, he could not quite agree that the quantity surveyor should be paid direct for them. This course might possibly result in the work being more evenly distributed amongst the members of the profession than was at present the case, and would doubtless prevent some architects from placing all their work in the hands of one quantity surveyor, but, from his experience of architects, the majority preferred to have a quantity surveyor who was cognisant of their methods and style, and the course suggested might lead to incompetent men being employed. He could not quite agree with Mr. West that, because a man was a measurer, he was a quantity surveyor. He agreed as to the utter impracticability of issuing standard bills of quantities. He was also glad to gather from the remarks of Mr. Pietersen and others that there was such a general opinion that bills of quantities should form part of the contract. He agreed with all that the Chairman said, but he must defend his reference to the first requirements of a quantity surveyor being accuracy, the second accuracy, and the third accuracy. Mr. Gate objected to this, and said that accuracy was only a habit, and that he should have added as a chief requirement brains. He submitted that no man could be accurate without brains. He was glad the Chairman condemned the frequent reference that had been made to inaccurate work caused by hurry. There could be no half measures in a bill of quantities.

Upon the motion of Mr. L. G. Cross, seconded by Mr. H. J. Camp, a unanimous vote of thanks was passed to the Chairman, who responded, and the proceedings terminated.

## *COMPETITIONS.*

BAPTIST CHURCH AND SCHOOLS, WALTHAMSTOW.—Acting on the advice of their assessor, the Building Committee have adopted the designs of Messrs. W. D. Church & Son, submitted in a limited competition. The building is to cost 7,500*l*.

BAPTIST SUNDAY SCHOOLS, ILFORD.—In a limited competition for these schools, the designs of Messrs. W. D. Church & Son were placed first by the assessor, and the Committee have instructed them to proceed with the work. Messrs. F. & A. Willmott, of Ilford, are the contractors.

SHIREHALL, NORWICH.—At the quarterly meeting of the Norfolk County Council, held at Norwich Shirehall, the Shire-

house Extension Committee reported with reference to the proposed enlargement of the Shirehall. They stated that they engaged the services of an expert, Mr. A. J. Wood, of 22, Surrey-street, to advise them, and had selected three sets of plans for the awards of a first premium of 100*l*., second 50*l*., and the third 25*l*., the designs being marked respectively M, G, and D. The architect of design M estimates the cost at 8,850*l*., Mr. Wood's estimate is 13,820*l*.; the estimate of design G 13,210*l*., Mr. Wood's estimate 13,640*l*.; of design D 9,500*l*., Mr. Wood's being 13,400*l*. It is probable, therefore, the Committee says, that the cost of the extension will in the end be 14,000*l*. It was stated that the following had won the premiums for the best plans submitted:—1, Mr. E. J. French, Upper King-street, Norwich, 100*l*.; 2, Mr. W. Waddington, Cheapside, 50*l*.; 3, Mr. J. W. Durham, Opie-street, Norwich, 25*l*.

## BOOKS RECEIVED.

TABLES OF IMPERIAL, METRIC, INDIAN AND COLONIAL WEIGHTS AND MEASURES. Compiled by Alfred J. Martin, F.S.I. (T. Fisher Unwin. 2s. 6d.)

AN INTRODUCTION TO OLD ENGLISH FURNITURE. By W. E. Mallett; with Illustrations by H. M. Brook. (*Country Life* Offices. 5s.)

THE CATHEDRALS OF ENGLAND AND WALES. By T. Francis Bumpus. Second Series. (T. Werner Laurie. 6s.)

GAS AND OIL ENGINE MANAGEMENT. By M. Powis Bale, M.Inst.C.E. Second Edition. (Crosby Lockwood & Son. 3s. 6d.)

THE WRITERS' AND ARTISTS' YEAR BOOK: 1906. (Adam & Charles Black. 1s.)

# Correspondence.

## ROYAL ACADEMY LECTURES.

SIR,—In the report of my lecture at the Royal Academy on the 8th, which you have kindly sent me, I notice that you comment on the inconvenience caused by there being no lantern. May I be allowed to say that the responsibility in this matter rests with me, and not with the management of the Royal Academy?

I had to make the necessary arrangements, and had done so, but unfortunately the lantern was sent by mistake to one of the other societies at Burlington House, and we waited for it in vain. Hence the delay, etc., which I very much regret.

GEORGE CLAUSEN.

## APPOINTMENT OF DISTRICT SURVEYORS.

SIR,—The letter from the President of the District Surveyors' Association to the London County Council, published in your last issue, is of interest, and presents an opportunity for the consideration of other points in addition to those referred to in the letter in question.

It is a well-known fact to architects practising in the London area that the London County Council has for some considerable time past been reducing the position of the District Surveyor to that of a machine.

Generally speaking, they are no longer allowed to think, and are prevented from applying their knowledge and experience to dealing on their own responsibility with the various and many points that arise from time to time due to the inconsistent provisions in the Building Act—points that in very many cases should be left to the architect to settle.

If it is the intention of the London County Council that without exception the District Surveyors are to see that the Act is carried out with all its inconsistences, it is simply a waste of the ratepayers' money to have such experienced men. Less experienced men at about 250*l*. per annum could do the work just as well, and the fees now charged could be much reduced. As matters stand at present many things have to be done simply because it happens to be the "law," and not because it adds in any way to the better construction or safety of the work or building, and in most cases is opposed to all rules of common sense, and last, but not least, the unfortunate client has to pay for this state of affairs.

It would be much better if some arrangement was made that in cases where architects lodged drawings with the Council, and the drawings having been approved by them, it would not be necessary for the surveyor to superintend the works, but he would have only to make a final visit to satisfy the Council that the approved drawings had not been departed from, for which a small fee might be charged. In this way the proper functions of the architect would not be encroached upon, the client's pocket would be saved somewhat, and the District Surveyor would have more time at his disposal to attend to the requirements of the "speculating" builder, where he would be more usefully employed.

I do not suppose for one moment that the Council would venture to dispute the fact that the architects practising in London are just as able to carry out their duties without supervision by the District Surveyor as with it.

The arrangement I have suggested above has been the practice in Scotland for over 300 years, and is administered by the Guild Court. It deals with all questions relating to a building, so that when the certificate to proceed has been granted nothing can prevent the works being completed provided the regulations and approved drawings are not to any extent departed from.

London on account of its size requires more than most places a clear, simple, but thorough system; instead we have the overlapping of Acts dealing with building, light and air, and sanitary matters—a state of affairs that it would be difficult to find equalled elsewhere.

AN ARCHITECT.

## INDEXES OR INDICES?

SIR,—Referring to the query in your appreciative notice of Vol. II. of the "Architects' Law Reports and Review," my authority for "indexes" is Dr. Morris, who at page 77 of his "Historical English Grammar" (Second Edition, 1875) says:—"Foreign words when naturalised form their plural in the ordinary English way, as *indexes, memorandums, automatons, focuses, beaus*, etc." He goes on to say that "Some of these have two plurals with different meanings, as indexes and indices," but he does not state the difference in meaning. Webster, however, while allowing the use of both plurals, makes the use of "indices" imperative for "the figures or letters (in arithmetic and algebra) which show the power or root of a quantity."

Referring to the plans and photographs, these are, of course, the special feature of the Reports, and, as pointed out in the introduction to the first volume, they are reproduced from the drawings actually "put in" at the trial. It will be well, however, to make this possibly a little clearer in future numbers by a note to each illustration.

Your remarks as to review matter are noted with thanks and will be well considered. The aim is in the direction you indicate.

ARTHUR CROW.

*** We agree with Dr. Morris and Mr. Crow, that "Index" is a naturalised English word and forms its plural accordingly. The query inserted by the reviewer escaped the Editor's notice, or it would have been deleted. We find, however, that some English dictionaries of repute give it as optional, "indexes" or "indices"; but we think "indexes" should be accepted as the proper form, regarding "index" as an accepted English word.—ED.

# The Student's Column.

## SOME MATHEMATICAL METHODS AND USEFUL DATA FOR ARCHITECTS.—III.

### *Numbers, Notation, and Numeration.*

ARITHMETIC may be briefly defined as the science of numbers, and is sometimes considered to be divisible into two branches: *theoretical* or *abstract arithmetic*, dealing with systems of notation and rules of computation, and *practical arithmetic*, devoted to methods of employing computations in science, art, and trade. It is very difficult, however, to draw a clear distinction between the theoretical and practical aspects of the science.

### *Numbers.*

A *number* was formerly considered as a quantity comprising two or more *units*. According to this definition, which is accepted by Euclid, the *figure* or *numeral* 1 is not a number.

The view of Ramus, which is generally adopted in arithmetic, is that 1 constitutes the lowest number. Modern mathematicians, however, treat 0 as a number, this being the starting-point of positive and of negative reckoning.

In a restricted sense the figure 1 certainly stands for the lowest whole number and signifies *unity*. Hence it is the lowest whole number that can be divided or multiplied by itself or any other whole number. As all numerical systems appear to have originated from the practice of counting on the fingers, 1 is obviously the first *digit*, and can be termed quite correctly the first numeral.

Digital calculations still come natural to children, and grown up people cannot always avoid the tendency to make the fingers of some service in the same way. But mathematicians who are able to detach their attention from physical aids to intellectual exercises are quite right in considering 0 as a number, although it cannot be defined as a digit. In a wide sense 0 can be taken as a number.

When standing alone 0 has no value. It is then neutral, and may be written $\pm 0$. But if placed at the right hand of another numeral it possesses a positive value, and clearly has a right to be included in the ascending series $+0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12$, etc.

As the starting-point of positive reckoning 0 is distinctly significant. Thus the equations $0 + 1 = 1$, $0 + 6 = 6$ mean that 1 and 6 respectively have been added to 0, and give this numeral a real position under the ordinary rules of addition. Similarly, the equations $1 - 1 = 0$, $6 - 6 = 0$ show that the numeral comes under the rules of subtraction.

In digital calculations 0 is the value denoted when no fingers are held up, and by freeing the mind from the idea that arithmetic has a material or corporeal basis it is not difficult to conceive negative or minus values, corresponding to a state of less than no fingers.

Consequently 0 is the starting-point of negative reckoning and can be properly included in the descending series $-0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12$, etc.

So, to use a simile, 0 may be likened to the fulcrum of a double lever, one arm of which is formed by an infinite series of positive numbers, and the other arm by an infinite series of negative numbers.

To proceed a stage further, it was not difficult for men in the early days of arithmetic to catch the idea that a finger was divisible into parts. Customs prevailing in those times were quite capable of suggesting the physical possibility, and the reasoning capacity of man was no doubt quite equal to the conception of fractional parts of a digit. In the present day we have passed far beyond the stage of regarding a digit as the sum of three joints or parts, and know that the number of fractions into which it may be divided is infinite. Hence an interminable number of values exists between 0 and 1, showing still more clearly that the former and not the latter figure is the starting-point.

Notwithstanding all that has been said above, the figure 1, as the lowest whole number, must be considered for some purposes as the starting-point.

In support of this view we have the fact that 0 multiplied by any number or any number multiplied by 0 is not increased in value. Thus $0 \times 10{,}000{,}000 = 0$. Similarly, 0 divided by any number, or any number divided by 0, is not decreased in value. Thus $\frac{0}{10{,}000{,}000} = 0$, and also $\frac{10{,}000{,}000}{0} = 10{,}000{,}000$.

If the abstract mathematical idea of treating 0 as a number were universally applicable to arithmetic, we might argue that as

$$50 \times 0 = 3 \times 0 \therefore 50 = 3$$

which, in accordance with the classical remark of Euclid, is absurd.

### *Notation and Numeration.*

*Notation* is the expression of numbers by characters, and *numeration* the reading of the characters so written.

The system of notation in general use is founded upon the radix 10, the decimal basis having originated in all probability from the method of reckoning by the fingers. There is no reason, however, why any other scale should not be used. As a matter of fact, the duodecimal scale would be preferable for some reasons, since the radix 12 is capable of more complete resolution than the decimal radix, and the duodecimal system is found convenient in certain calculations which have frequently to be made by architects, builders, and others.

Confining attention for the present to decimal notation, we find that the nine digits 1 to 9 together with the cipher 0 enable us to make one group of 10, that groups of 10 can be assembled until 100 is reached, that groups of 100 may be put together until their sum is 1,000, and that the process of grouping can be continued *ad infinitum* in units of 10 or multiples of 10 as may be preferred.

Each digit has two values according to circumstances; the first an *absolute* and the second a *relative* value.

The absolute value indicates the number of units expressed and is unchangeable. Thus 5 always means *five*, although the figure may serve to denote 5 units, 5 tens, 5 hundreds, and so on.

The relative value depends upon the order of the units indicated and upon the nature of the unit of comparison, which may refer to tens, hundreds, or any other groups or multiples of 10.

The various multiples of 10 are too well known

in themselves to require enumeration here, but as the interpretation of some of them is not the same in all countries we give in Table I. the British, American, and Continental readings of a few multiples or powers of 10 from $10^6$ to $10^{60}$.

As a *power* is the result of multiplying a number into itself a specified number of times, the number of ciphers following the figure 1 in any power of 10 is denoted by the *index* placed at the right hand of the number itself. Thus $10^0 = 1$, $10^1 = 10$, $10^2 = 100$, $10^3 = 1{,}000$, and so on.

The uses of powers will be discussed later, but at the present juncture we may note the convenience of denoting large multiples of 10 by the aid of an index, instead of having to write a long succession of ciphers. For instance, it is far more economical to indicate a thousand million by the expression $10^9$ than by 1,000,000,000.

TABLE I.—SOME POWERS OF TEN AND THEIR DESIGNATIONS.

| Power of Ten. | Power of Million. | British Empire. | United States and Continent. |
|---|---|---|---|
| $10^0$ | — | one | one |
| $10^1$ | — | ten | ten |
| $10^2$ | — | hundred | hundred |
| $10^3$ | — | thousand | thousand |
| $10^6$ | $1{,}000{,}000^1$ | million | million |
| $10^9$ | — | 1,000 million | billion |
| $10^{12}$ | $1{,}000{,}000^2$ | billion | trillion |
| $10^{15}$ | — | 1,000 billion | quadrillion |
| $10^{18}$ | $1{,}000{,}000^3$ | trillion | quintillion |
| $10^{21}$ | — | 1,000 trillion | sextillion |
| $10^{24}$ | $1{,}000{,}000^4$ | quadrillion | septillion |
| $10^{27}$ | — | 1,000 quadrillion | octillion |
| $10^{30}$ | $1{,}000{,}000^5$ | quintillion | nonillion |
| $10^{33}$ | — | 1,000 quintillion | decillion |
| $10^{36}$ | $1{,}000{,}000^6$ | sextillion | — |
| $10^{42}$ | $1{,}000{,}000^7$ | septillion | — |
| $10^{48}$ | $1{,}000{,}000^8$ | octillion | — |
| $10^{54}$ | $1{,}000{,}000^9$ | nonillion | — |
| $10^{60}$ | $1{,}000{,}000^{10}$ | decillion | — |

This table shows that a very serious discrepancy exists between the British system of numeration and that adopted on the Continent and followed in the United States. Our own system is derived from that of the Italians, who possessed two methods of numeration for the higher multiples, one proceeding by powers of a million and the other by powers of a thousand. It appears that the French confused the two methods of procedure, and in adopting the system of counting by thousands applied the names properly belonging to powers of a million. Consequently so much confusion has arisen that words denoting numbers higher than a million are rarely used in the present day.

In writing numbers of more than three figures it is usual in this country to employ a comma at the left of each group of three figures, thus: 10,000,000, for the purpose of assisting the eye in reading the values. On the Continent and in America it is the general, but not universal, practice to dispense with a separating stop and to arrange the figures thus: 10000000 or 10 000 000.

The comma is sometimes employed on the Continent in accordance with British custom, but unfortunately it is also used as a decimal point. This is a most inconvenient arrangement, and one exceedingly apt to cause serious misconception on the part of British and American readers of Continental technical literature.

For example, the length 1·875 metres is frequently written or printed on the Continent 1,875 metres, which, of course, is a very different thing. In France, the rational use of the full stop and comma is now being introduced, but in Germany the comma is still generally employed as a decimal point. The result is that considerable discrimination has to be exercised by those who read books and periodicals published abroad.

One great convenience of the decimal system of notation is the facility it affords for the division of numbers by moving the decimal point from its understood position at the right hand of a whole number to any other position. For example $1{,}000 \div 100 = 10{\cdot}00$.

Similarly any number can be multiplied by adding ciphers at the right hand with a corresponding movement of the decimal point, as $10 \times 100 = 1{,}000$. The same operation can be performed with *mixed* numbers or those consisting of a whole number and a decimal fraction. Thus $105{\cdot}62 \times 10 = 1{,}056{\cdot}2$.

People have become so accustomed to the decimal system that it is not obvious to all that calculations can also be performed to any scale of notation.

Any radix other than 10 might have been adopted, as, for instance, 2, 3, 4, 5, 6, 7, 8, 9, 11, or 12, corresponding with the *binary*, *ternary*, *quaternary*, *quinary*, *senary*, *septenary*, *octary*, *nonary*, *undecenary*, and *decenary*, or *duodecimal* systems of notation.

Of these the duodecimal system is used to a certain extent in our own country, owing to the fact that 12 inches are contained in 1 foot and 12 pence in 1 shilling. But to suit the scale for employment in a general way it would be requisite to assign new symbols for the numbers 10 and 11 so as to avoid confusion. This will be made clear by inspection of Table II., comparing the decimal and duodecimal numbers up to 12 in each case.

TABLE II.—COMPARISON OF DECIMAL AND DUODECIMAL SCALES UP TO 12.

| Decimal System. | Duodecimal System. |
|---|---|
| 1 = 1 | 1 = 1 |
| 2 = 2 | 2 = 2 |
| 3 = 3 | 3 = 3 |
| 4 = 4 | 4 = 4 |
| 5 = 5 | 5 = 5 |
| 6 = 6 | 6 = 6 |
| 7 = 7 | 7 = 7 |
| 8 = 8 | 8 = 8 |
| 9 = 9 | 9 = 9 |
| 10 = (1 × 10) | (10) = (10) |
| 11 = (1 × 10) + 1 | (11) = (11) |
| 12 = (1 × 10) + 2 | 10 = (1 × 12) |
| — = — | 11 = (1 × 12) + 1 |
| — = — | 12 = (1 × 12) + 2 |

When we write 1 ft. 11 in., 1′ 11″, or 1s. 11d. there is no difficulty or confusion. But to write 111 as an expression for (1 × 12) + 11 would be misleading, for that is the proper way of denoting (11 × 12) + 1; and to write 1 (11) for (1 × 12) + 11 would be clumsy. Hence the need for new symbols in the duodecimal system.

The application of duodecimals to architectural practice will be discussed later, and for the present we shall leave the subject after giving some illustrations showing the manner in which the system is applied under the four simple rules of arithmetic.

*Example* (1).—*Find the sum of* 9 *and* 7 *and express the result in duodecimal notation.*

When the two numbers are taken together they evidently contain 1 unit of *twelve* and 4 primary units or $(9 + 7) = (1 \times 12) + 4$. Hence the answer is 14.

The process is analogous to that performed when we add 9 in. and 7 in. Then, as above $(9 + 7) = (1 \times 12) + 4$, and the answer is written 1 ft. 4 in.

*Example* (2).—*Find the difference of* 25 *and* 18 *and express the result in duodecimal notation.*

Remembering that $25 = (2 \times 12) + 5$, and $18 = (1 \times 12) + 8$, it is clear that we must borrow from the second place of 25, 1 unit of 12, add this to the 5 in the first place of the same number, and then subtract 8, leaving 9, which is the difference required.

The procedure is practically the same as that followed in finding the value of 2 ft. 5 in. − 1 ft. 8 in. = 9 in.

*Example* (3).—*Find the product of* 9 × 8 *and express the result in duodecimal notation.*

The product of the two figures includes 6 units of 12 and 0 as remainder, or $(9 \times 8) = (6 \times 12) + 0$. Hence the answer is written 60, whereby the proper *relative* value of 6 is given.

This process is practically the same as that involved in the multiplication of 9 pence by 8, stating the answer in shillings, or 9d. × 8) = 6s. 0d.

*Example* (4).—*Find the quotient of* 24 ÷ 4 *and express the answer in duodecimal notation.*

Here $24 = (2 \times 12) + 4$, and four divided into this gives 7 with no remainder. Hence the required quotient is 7.

A parallel case is afforded by dividing 4 into 2 ft. 4 in. = 7 in.

Two simple but useful rules arising out of duodecimal notation are:—

(1) Shillings per foot = pence per inch.
(2) Shillings per dozen = pence per unit.

## OBITUARY.

MR. JOHN WALKER.—We have to record the death of Mr. John Walker, of the firm of Messrs. Walker & Slater, builders, of Derby. Deceased, who had undergone a long illness, passed away at his residence, Uttoxeter-road, at the age of sixty-four. The late Mr. Walker became a representative of Friar-gate Ward in the Town Council in 1895, and retired last year.

## GENERAL BUILDING NEWS.

FACTORY, EDINBURGH.—Among those who received warrants at the Edinburgh Dean of Guild Court on the 11th inst. was the publishing firm of Messrs. Thos. Nelson & Sons for a factory and warehouse at Parkside Works, Dalkeith-road, Edinburgh. This is to be a large addition in the rear of the present works of the firm, and the building will be the first in Edinburgh to be constructed on the Hennebique's system of ferro-concrete. It will be made entirely of steel rods encased in concrete—walls, roofs, pillars, and beams. The architects are Messrs. Cousin, Ormiston, & Taylor.—*Scotsman.*

LIBRARY, WREXHAM.—On the 1st inst. the Mayoress of Wrexham laid the foundation-stone of a new library for the borough. The architect is Mr. Vernon Hodge, and the builder Mr. George Rowley, of Gresford.

PHŒNIX INSURANCE COMPANY'S OFFICES, LEEDS.—In 1903 the Phœnix Insurance Company purchased a valuable site in South Parade, Leeds, for their proposed new offices; the existing buildings were pulled down and a new building has been erected by the Phœnix Company which not only gives accommodation for their own use but also provides several suites of offices for letting-off purposes. The new block faces South Parade and its back elevation faces Bedford-street. In addition to the basement it rises to a height of four stories and is crowned with a Mansard roof. The suite of offices occupied by the Phœnix Company is situated on the ground floor of the front block and comprises a large general office, secretary's private office, and typewriter's office. The remainder of the building in the front and back blocks is planned to accommodate ten suites of offices with all requisite lavatory accommodation fitted up with the most recent type of sanitary fittings. The front elevation and return side is faced with stone from the Cullingworth quarries, the eastern side with white glazed brickwork and the back elevation fronting to Bedford-street with red pressed bricks. The roof is covered with green slates from the Tilberthwaite quarries. Glazed brickwork and tiles have been used largely in the interior of the building, the former supplied by the Leeds Fireclay Company, and the latter by Mr. Alfred Whitehead, of Leeds. The whole of the walls of the Phœnix suite of offices are lined with tiles of a deep tone of ivory white, and all corridors and staircases are provided with celadon green glazed tile dadoes, 5 ft. in height. In addition to a wide staircase of concrete steps provided by the Granolithic Company, a passenger lift, Messrs. Waygood & Co.'s make, gives access to the various floors. The contractors for the building are as follows:—Basement work, Messrs. Chas. Myers & Sons; mason, brick, carpenter, and joiner, Messrs. Henry Atkinson & Sons; plumber and glazier, Messrs. Thos. Story & Co.; plasterer, Mr. T. Moore; iron and steel, Mr. Leonard Cooper; slater, Mr. J. Season; painter, Mr. Fred Jackson (all of Leeds). The electric light is fixed by Messrs. John Collier & Co. (Manchester). The wood and stone carving have been executed by Messrs. Smithson & Wallis (Leeds); the iron palisading and grille over entrance, by Mr. Nelson Dawson (Chiswick); bronze cartouches, electric light fittings, etc., by The Bromsgrove Guild of Handicraft; stained and leaded glass, by Messrs. Pape & Co. (Leeds); and plaster enrichments of ceilings by Mr. G. P. Bankart. The heating system is by Messrs. W. Richardson & Co. (Darlington). The fittings and furniture in the Phœnix suite of rooms have been specially designed by the architect. They are carried out in polished teak and stained and polished Kauri pine, and have been executed by Messrs. T. Horsman & Co. (Leeds). Messrs. Elgood & Co. have supplied locks and ironmongery. The new building, which is in the Renaissance style, has been erected from the designs and under the superintendence of Mr. William Thorp, of Leeds. Mr. W. H. Tarran has been the clerk of works. The total cost of the structure, including the fittings, but exclusive of the site, will amount to upwards of 11,000*l.*

THE WOOLWICH TOWN HALL.—The new Town Hall for Woolwich, which was opened on the 13th inst., is situated in the centre of Woolwich, in the vicinity of a group of public buildings, including the Polytechnic, the Public Library, the Police and County Courts, and the Public Baths. The principal façade in Wellington-street is 114 ft. long, and the façade in Upper Market-street 230 ft. long. Around the central hall, which runs up through two stories, the whole of the official departments are grouped together with the Council suite and the suite of Committee rooms. On the ground floor are the Borough Engineer, the Medical Officer of Health, the Borough Treasurer, and the Electrical Engineer, the accommodation of each department being supplemented by an equal number of rooms in the basement. Ascending the principal staircase at the end of the hall a gallery is reached which leads to the suites of principal rooms and the Town Clerk's department. The Council suite includes the Council chamber, the members' ante-room, and lavatory, all intercommunicating,

the chamber being in the form of a Greek cross surmounted by a dome. It provides seating accommodation for fifty-six members and a public gallery for sixty persons. The Central Committee room is a domed apartment divided from the two adjoining committee rooms by movable screens. By the raising of the dividing screens by means of a simple mechanical contrivance this suite of committee-rooms is transformed into a reception-room 60 ft. long by 30 ft. wide, suitable for mayoral and other functions. Adjoining the committee suite is the Mayor's reception-room and communicating with both is a service-room with an electric lift to the kitchen in the basement. In the tower at the corner of the building is the Mayor's private room with casement doors leading to the Mayor's balcony, from which the results of elections can be declared; and adjoining this room is the Town Clerk's department, which occupies the whole length of the building on the first floor, supplemented by rooms on the ground floor and further rooms in the basement. At the back of the official portion of the building is placed the public hall, so designed that it may be used in conjunction with the Town Hall or entirely shut off for public purposes. The warming and ventilation is on the Plenum system. In the centre of the entrance-hall is a statue of Queen Victoria by Mr. Pomeroy. The interior of the council-room is enriched with modelled plaster work, and the panelling and furnishing of the room are in wainscot oak. The windows of the committee suite overlooking Wellington-street are filled with stained glass illustrating historical subjects. In the design of the Public Hall, which accommodates an audience of 750 and a chorus on the platform of 100, an endeavour has been made to overcome the disadvantage in the customary long hall of the distance of the back rows of seats from the performers on the stage, and by the adoption of the Greek cross arrangement it is claimed that the whole of the audience is well concentrated round the stage so that all persons have an equal opportunity of hearing and seeing the performance. Three of the large windows of the hall are filled with stained-glass windows commemorating three distinguished natives of Woolwich, viz., Lovelace, Maudslay, and Gordon. Mr. Brumwell Thomas is the architect. The stained glass is the work of Mr. Geoffrey Webb in consultation with the architect and Mr. W. T. Vincent, the President of the Woolwich Antiquarian Society. The wood carving and the external stone carving is the work of Messrs. Martyn (Cheltenham); the modelling of the plaster enrichments of the principal rooms is the work of the Bromsgrove Guild (Worcester), and the bronze electroliers are by Messrs. Singer (Frome, Somerset). The further list of firms employed in the building is as follows:—General building contract, Messrs. J. E. Johnson & Sons (Leicester); heating and ventilation, Messrs. Jeffreys (Westminster); electrical work, the Borough Electricity Department; decorative plaster, Messrs. Tanner (Liverpool); wrought ironwork, Messrs. Starkie Gardner (Lambeth) and the Bromsgrove build; marble work, Messrs. Farmer & Brindley (Westminster); locks, etc., Messrs. Gibbons (Wolverhampton); mosaic work, Messrs. Simpson; Casements and lead glazing, Messrs. Hope (Birmingham); strong room doors, Messrs. Tann; safes, Messrs. Ratner; grates, the Well Fire Company; lightning conductors, Messrs. J. W. Gray & Son; clock in tower, Messrs. Smith (Derby); electrical clocks, the Magneta Company; fire alarms, the Pearson Fire Alarm Co.; fire appliances, Messrs. Merryweather (Greenwich); council chamber fittings, Messrs. H. H. Martyn & Co. (Cheltenham); committee suite fittings, Messrs. Hampton & Sons; furnishing, Messrs. Hampton & Sons, Waring & Gillow, Shoolbreds, and Martyns (Cheltenham).

## *MISCELLANEOUS.*

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Andrew Brown & Co., 110, Cannon-street, E.C., have been appointed the London and district agents for Messrs. Vaughan & Son (West Gorton, Manchester), makers of electrically-driven cranes.

ARCHITECTURAL ASSOCIATION STUDENTS' CONCERT.—The Second Annual Smoking Concert of Architectural Association Students takes place on February 2, at the Gaiety Restaurant. The tickets are 2s. 6d. each, and any surplus is to be given to the Architects' Benevolent Society and towards the foundation of an Architectural Association Musical and Dramatic Society.

GLASGOW ARCHITECTURAL TRAVELLING SCHOLARSHIPS.—A meeting of the Council of the Glasgow Institute of Architects, who, along with Mr. John Shields, are the trustees for the Alexander Thomson Travelling Studentship, was held on the 11th inst., when the first prize was awarded to Mr. James Whitelaw, Loancroft, Uddingston, and the second to Mr. F. M. Craik, 136, Stanmore-road, Glasgow. The prizes are 60*l.* and 20*l.* respectively.

BEDFORD BUILDERS' ASSOCIATION.—The Bedford Builders' Association held their annual dinner at the Central Restaurant, Bedford, recently, when Mr. Richard Black occupied the chair. The loyal toast having been honoured, "The Mayor and Corporation" was proposed by Mr. Chas. Negus. The Mayor responded, and said it was thirty-eight years ago since he started for himself in the building trade, and he remembered the first builders' dinner twenty-three years ago. The annual dinner fell through for some years, but had been revived. The Mayor then commented upon the progress, improvements, and low rates of the town. Mr. Valentine in responding, referred to the work of the Buildings Committee, who, he said, were always pleased to see plenty of plans. The trade had been under a cloud in Bedford and most other places, but those before him did not look very doleful, and they would pull through. Let the builders get out good plans, novel ideas, and something attractive to induce people to come, and the Corporation would maintain the good character of the town for good sanitation. Mr. Longhurst said the Corporation, he was sure, would do their best to further the interests of the town, and the building trade in particular. The Rev. W. P. Beckett, in proposing "Success and Prosperity to the Bedford Builders' Association," said the builders had had to contend with shortness of money, keen competition, and the water scare. Another bugbear was the Workmen's Compensation Act. They could hardly leave a job without being afraid some man would tumble off a scaffold, with the result that the builder, who would otherwise be doing well, would have to put his hands into his pockets. As the Builders' Association was well represented on the Corporation, and had considerable power, he hoped they would keep the rates low without losing efficiency. He thought there should be a more equitable agreement between landlord and tenant. The Bedford tenants were not at all his ideal. They stayed for only a short time, and at the end of three or four years the landlord had to spend a year's rent in doing the house up again. The builders might very well arrange with the house-agents to draw up an agreement more in accordance with the practice in London. He had seen lately houses sold at a price which should yield a 10 per cent. rental, but it would be whittled down in the long-run to about 3 per cent. by repairs, etc., whereas in other parts of the country a 6 per cent. rental was considered fair. The Chairman replied, and said that in 1904 the number of plans passed by the Council was 105, including 52 new houses, but in 1905 there were numerous plans, including 119 houses. He agreed with Mr. Beckett that a fresh tenancy agreement was needed, but it could only be got by united effort. The least they could expect to spend on a three years' letting was a year's rent. Mr. J. Rowlands, in proposing "The Town and Trade of Bedford," referred to improvements carried out in the town during his twenty-three years' residence. He thought the introduction of works employing skilled labour should be encouraged, but they did not want to turn Bedford into a little bit of black country. Mr. J. P. White having referred to the depression of the last two years, spoke hopefully of the prospects. He said there were 7,341 inhabited houses, against 5,946 ten years ago. There were not so many empty houses by a long way as there had been.

CHANCEL SCREEN, PARISH CHURCH, MELTON MOWBRAY.—A chancel screen has just been placed in Melton Church at a cost of about 600*l.* The screen was designed by Mr. J. Oldrid Scott, and the work has been carried out by Messrs. Thompson, of Peterborough.

RAPID BRIDGE ERECTION.—A remarkably expeditious engineering operation was effected at Beckenham on Saturday last by the erection of a railway girder bridge in less than a single day. The bridge is on the line between Norwood and Beckenham Junctions, joining the South-Eastern and Chatham and the London, Brighton, and South Coast Railways. For some time past the condition of the old bridge has been such that it became evident the structure would have to be replaced, and, while the new steel girders were being prepared, it was shored up so as to avoid the risk of any mishap. On Saturday the members of the new bridge were delivered and assembled on the site, and in the evening of the same day, after traffic had ceased, the superstructure of the bridge was taken away and the piers were prepared for the reception of the new girders. These were placed in position by means of two large cranes, and by Sunday afternoon the bridge was ready for the restoration of the permanent way, which was completed in time for the resumption of traffic on Monday.

ARCHITECTS' BENEVOLENT SOCIETY.—The President of the Architects' Benevolent Society (Mr. John Belcher, A.R.A.) has received 50*l.* from Mr. Howard Chatfeild Clarke towards the 500*l.* which it is hoped may be raised in accordance with the terms of Mr. Walter Emden's offer of 50*l.* if nine other gentlemen contribute a like sum. So far, including Mr. Emden, there have been four responses to this appeal.

AN ARCHITECT M.P.—Mr. John Edward Sears, the new member of Parliament for Cheltenham, is the son of the late Rev. James Sears, for nearly twenty-five years minister of the Cottage Green Church, Camberwell. He is a Fellow of the Royal Institute of British Architects, and he became a member of the London County Council in 1901, and at the present time is Chairman of the Housing Committee.

## Legal.

### DISPUTE AS TO A BUILDING ESTATE.

AN application was made to Mr. Justice Swinfen Eady on the 16th inst. in connexion with an action by the executors of the late Dr. Gurney, of Gosforth, against Messrs. Packman & Sons, Ltd., of Blackpool.

Counsel stated that the plaintiffs entered into a contract with the defendants for the sale to them of the residential estate of Rosewith, at Gosforth, in September last. The purchase was to have been effected by November 11, but despite constant applications the defendants had not yet completed the contract. Notwithstanding the fact that the defendants were not entitled to have possession, they had trespassed on the premises by putting a padlock on the entrance-gate, by removing turf from the lawn, and by putting up a notice that the trees on the estate were for sale, and inviting tenders. If the purchase was not completed very serious damage would be done to the property as a residential estate. The defendants, who had paid 1,300*l.* out of 13,000*l.*, which was the purchase price, were buying the property simply as a building estate, and had put up a notice intimating that they were prepared to sell plots of the land for that purpose. He asked for an injunction to restrain the defendants from committing the acts complained of until next motion day.

His lordship granted the application, with liberty to serve the defendants with notice of motion for the 19th inst.

### CONVERTING A BUILDING.

AT the Stratford Police Court on Saturday last week the justices gave their decision in a case in which Ernest F. Selby, a builder, of Hartley-road, Leytonstone, was summoned by the Wanstead Urban District Council that during August, 1905, he caused to be converted into more than one dwelling-house a building known as "Caufield," Herman-hill, originally constructed as one dwelling-house, and refused to send to the Council plans and sections of every floor of such building, contrary to sect. 90 of the Council's by-laws.

At the hearing of the case it was contended by Mr. Mallinson for Mr. Selby that the by-law was bad, because it had not yet been sanctioned by the Local Government Board, and there was uncertainty as to the meaning of it. The alterations carried out did not, it was urged, involve any alteration to the exterior of the house, and the only thing done was to put up a partition inside the house.

In giving the decision of the Bench, the Chairman said they found that By-law 90 was not bad for uncertainty, and, as a fact, Mr. Selby converted the building in question, which was originally constructed as one dwelling-house, into two dwelling-houses. The by-law also applied to a new building as defined by sect. 159 of the Public Health Act of 1875, and the Bench were of the opinion that that section had been infringed. The attention of the Court ought, however, to have been drawn to the case of Hall and others *v.* Eastbourne Mayor, etc.

A fine of 40*s.* and 4*s.* costs was imposed, and the Bench agreed to state a case.—*Tribune.*

## PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

19,903 of 1904.—A. R. HUBBARD and R. FLAY: *Cooking Ranges.*

This relates to a cooking range in which a fire contained in a fire place is used for heating a hot plate placed above it upon which different cooking operations can be performed, and also for heating an annular horizontal boiler arranged above the fire place. According to the invention, two rectangular ovens, placed one above the other, are arranged at one side of and adjoining the cooking range, the bottom of the upper one being level with the hot plate above the fire and the bottom of the one below reaching to the bottom of the range near the ground.

27,362 of 1904.—C. E. KONIG: *Doors, Windows, and Shutters.*

This consists in connecting the stiles and rails of a window or door by means of tenons, which at the connection of the lower rail with the stiles are made to slope down to the outside, and which are covered by the whole thickness of the wood on the inner side by a shoulder which overreaches the lower rail and slopes upwardly towards the outside, and in front and on the outer side by the sloping of the cheeks, for the purpose of preventing entry of water in the mortice.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

28,032 of 1904.—G. S. MAYHEW: *Machines for Forming Compound Deals.*

This relates to a machine for assembling compound deals, and consists of a table provided with a series of guides on which is or are mounted a lower clamp or clamps and a series of upper clamps, said lower clamps and series of upper clamps being respectively adapted to be moved together to compress pieces of wood to build up a compound deal and to be moved apart to allow a fresh piece or pieces of wood to be placed in position.

3,120 of 1905.—M. J. ADAMS: *Fire Places.*

This relates to a fire place, and consists in the use of a fire brick so constructed that the lower portion, which is subject to damage by fire, may be renewed without disturbing the upper portion, which is carried on brick or other support.

3,978 of 1905.—R. BLESSIN: *Electrical Alarm Contacts for Door Locks.*

This relates to an electrical alarm contact for door locks, consisting of a handle and cone or plug of insulating material provided with contacts on the outer end and a spring on the side of the cone.

4,824 of 1905.—H. LAWRENCE: *Fender and Ash Pan Fronts.*

This relates to a sheet metal fender or ash-pan front, having a quilled or twist-patterened ornamental length made integral with or fashioned from the metal of the said article.

5,416 of 1905.—C. H. WILSON: *Windlasses.*

This relates to a windlass consisting of a pawl box preferably provided with only one pawl, said pawl being pivoted in the box and having a tail piece which projects outside the box, to which tail piece the rod from the pivoted cross-head of the windlass is connected.

7,457 of 1905.—W. OLDAKER and J. H. OLDAKER: *Window Casements.*

This relates to the method of opening and closing window casements by means of hinges sliding in the head, and sill channel and lever gear so fixed as to be wholly outside the head and sill channel of the casement, thereby preventing any cutting away of the head, sill, or casement, which would cause the casement to be more effectually rain and weather proof, and which opens outwardly with an aperture at the hinged side for cleaning.

9,026 of 1905.—E. L. P. DAVISON: *Grates for Stoves and Fire Places.*

This relates to domestic stoves and fire places having the ash grid or grate resting upon a frame and being capable of having a sliding or shuffling movement imparted to it within the fire grate.

9,067 of 1905.—F. J. J. GIBBONS: *Hinges for Doors or Windows.*

This relates to a butt-hinge for a door or window, comprising a tubular lining within the socket of each leaf, and a hinge pin adapted to fit the interior of both tubular linings, each tubular lining being enlarged at the end which butts against the other, and one tubular lining being adapted to be longitudinally displaced, an adjustable distance, relatively to the socket within which it fits.

9,409 of 1905.—A. REID and A. HENDERSON: *Disinfector or Fluid Disinfectant or Deodoriser Supplying Vessel for Flushing Cisterns and the like.*

This relates to a disinfector, comprising a container, a discharging tube, an air pipe, and an annulus or hollow ring having jet orifices therein from which the discharging tube and the air tube extend.

9,591 of 1905.—F. W. CROSS and R. ROUGHTON: *Combined Window Fasteners and Draught Excluders.*

This relates to a device forming a combined window fastener and draught excluder, which consists of a lateral bar with screw stem and operating thumb screw housed in the top bar of the lower window sash and adapted to be moved outward into a corresponding groove in the adjacent bottom bar of the upper sash in such a manner as to lock the sashes and prevent draught between these bars.

14,288 of 1905.—F. D. JACOBS: *Building Materials for Roofing and like purposes.*

This relates to a roofing material comprising a base or body portion consisting of a sheet of annealed steel and a protective layer of asbestos sheeting on each side of said piece, said asbestos being united to said base by a uniting material composed of rubber solution and asphalt.

15,132 of 1905.—S. BROADBENT and A. STEPHENS and F. D. JEAVONS: *Chimney Pot or Top.*

This relates to a chimney pot or top of the kind in which an outer cover is supported over an inner pot or top in such a manner that the air or wind can enter through the bottom and pass up through tapered air passages between the inner pot and the cover, and consists in forming the square lower portion of the inner pot with claws or lugs at its corners to support an outer cover, and with inclined air admission conduits or apertures between the said claws or lugs.

22,310 of 1905.—S. E. PAGE: *A Socket for Securing Bolts in Walls.*

This relates to a socket for securing bolts in walls, and consists of a bolt anchor section formed with a plurality of interiorly transversely corrugated portions and a plurality of exteriorly corrugated portions, said portions being alternately disposed, the exteriorly corrugated portions being of the greater diameter.

2,626 of 1905.—J. SOUTHERST: *Receptacle or Vessel for Use in Supplying Disinfectant in a simple and Economical Manner to the Water Discharges or Flushes from Cisterns of Water-Closets and the like.*

This relates to a receptacle or vessel for supplying disinfectant to water discharges from cisterns of water-closets and the like, consisting of a bottle of glass or other non-porous material formed with an aperture or apertures on or near the shoulder of the bottle and with or without a perforated cap or stopper.

13,164 of 1905.—J. CRAMPTON: *Interlocking and interchangeable Hollow Blocks for Breakwaters and the like, and Means for Connecting them together.*

This relates to an interlocking and interchangeable hollow block having upon the exterior faces thereof projections in the form of dovetails, half dovetails, or squares, provided with ducts or grooves and ports or slots, by which the blocks may be connected together.

17,602 of 1905.—J. NISBET: *Construction of Composite Beams and Columns for Use in Connection with Fire-proof Building or other Fire-proof Constructional Work.*

This relates to a composite beam or column made up of two or more lengths of corrugated iron or steel, arranged to present a series of tubes or tubular formations communicating with each other, in conjunction with concrete filling.

19,317 of 1905.—J. NISBET: *Formation of Supports for Concrete Floors, Ceilings, and Walls.*

This relates to a fire-proof support for floorings, ceilings, or walls, and consists in the provision, in conjunction with an iron or steel support of corrugated section, of tie rods situated in the depression of said beam and adapted to be surrounded by concrete or cement run in in semi-liquid form.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

**January 9.—By REYNOLDS & EASON.**

| | |
|---|---|
| Leytonstone.—Barclay-rd., f.g.r. 15*l.*, reversion in 75½ yrs. | £360 |
| Melford-rd., f.g.r. 16*l.*, reversion in 81½ yrs. | 390 |
| Mayville-rd., f.g. rents 32*l.* 10s., reversion in 80 and 76 yrs. | 765 |
| Park Grove-rd., f.g.r. 20*l.*, reversion in 81 yrs. | 480 |
| Upton Park.—190 and 192, Boleyn-rd., f., w.r. 52*l.* | 410 |
| Holloway.—301, Camden-rd., u.t. 40½ yrs., g.r. 4*l.*, e.r. 60*l.* | 510 |
| Bow.—213, Burdett-rd., u.t. 60½ yrs., g.r. 6*l.* y.r. 36*l.* | 330 |
| 85, 87, and 89, Turners-rd., u.t. 59 yrs., g.r. 13*l.* 10s., y.r. 96*l.* | 865 |
| Mile End.—29 to 43 (odd), Eric-st., u.t. 54 yrs., g.r. 42*l.*, w.r. 293*l.* 16s. | 1 670 |

**January 10.—By HUGHESDON & HINDS.**

| | |
|---|---|
| Wokingham, Berks. — "Wiltshire Farm," 2½ acres *f.*, p. | 2,870 |

**January 11.—By NOKES & NOKES.**

| | |
|---|---|
| Dulwich.—335, Lordship-la., u.t. 74¼ yrs., g.r. 7*l.*, y.r. 36*l.* | 315 |

*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; *f.* for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

## MEETINGS.

**FRIDAY, JANUARY 19.**

*Architectural Association.*—Mr. F. Lynn Jenkins on "The Consideration of Sculpture by Architects." 7.30 p.m.

*Royal Institution.*—Professor J. J. Thomson on "Some Applications of the Theory of Electric Discharge to Spectroscopy." 9 p.m.

*Institution of Mechanical Engineers.*—(1) Discussion to be resumed and concluded on paper on "The Behaviour of Materials of Construction Under Pure Shear," by Mr. E. G. Izod; (2) Mr. Robert A. Bruce on "Worm Contact." 8 p.m.

**SATURDAY, JANUARY 20.**

*Builders' Foremen's Association.*—Twelfth annual dinner, King's Hall, Holborn Restaurant. 6.30 p.m.

**MONDAY, JANUARY 22.**

*Royal Institute of British Architects.*—(1) To read the deed of award of prizes and studentships for 1905-6. (2) Papers on "Metalwork," by Messrs. J. M. Swan, R.A., Montague Fordham, and Walter Gilbert. 8 p.m.

*Liverpool Architectural Society.*—Mr. T. T. Rees on "The Laying-out of Streets, Buildings, Open Spaces, Parks, Planting of Trees, Advertising Hoarding, and Smoke Nuisances." 6 p.m.

**TUESDAY, JANUARY 23.**

*Royal Institute of British Architects.*—Annual Exhibition of Designs and Drawings submitted for the Institute prizes and studentships, in the gallery of the Alpine Club, Mill-street, Conduit-street. 10 a.m. to 8 p.m. (Close on February 3.)

*T. Square Club.*—The first meeting and invitation supper to be held at the "Monico" Restaurant, 46, Regent-street, Piccadilly-circus, W. 6.30 p.m.

*Institution of Civil Engineers.*—Discussion of papers read at previous meeting. 8 p.m.

**WEDNESDAY, JANUARY 24.**

*Society of Arts.*—Dr. J. Nisbet on "The Planting of Waste Lands for Profit." 8 p.m.

*Edinburgh Architectural Association.*—Mr. J. M'Kessack on "Architectural Photography," illustrated by lantern slides. 8 p.m.

**THURSDAY, JANUARY 25.**

*Society of Arts (Howard Lecture.)*—Professor Silvanus Thompson on "High Speed Electric Machinery, with special reference to Steam Turbine Machines," II. 8 p.m.

*London Institution.*—Mr. Maurice N. Druequer, M.A., on "Legal History of Trades Unionism." 6 p.m.

*Institution of Electrical Engineers.*—Mr. F. W. Carter, M.A., on "Technical Considerations in Electric Railway Engineering." 8 p.m.

**FRIDAY, JANUARY 26.**

*Junior Institution of Engineers (Westminster Palace Hotel).*—Honorary members' lecture of the 25th session. "Notes on Boiler Trials," by Professor J. D. Cormack, B.Sc. 8 p.m.

*Institution of Civil Engineers.*—(Students' meeting.) 8 p.m.

**SATURDAY, JANUARY 27.**

*Junior Institution of Engineers.*—Visit the engineering laboratories of University College, during which Professor Cormack will demonstrate the methods of conducting a boiler trial. 3 p.m.

## PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

### BRICKS, &c.

| | £ | s. | d. | | | |
|---|---|---|---|---|---|---|
| Hard Stocks | 1 | 7 | 0 | per 1000 alongside, in river. | | |
| Rough Stocks and Grizzles | 1 | 4 | 0 | " | " | " |
| Facing Stocks | 1 | 16 | 0 | " | " | " |
| Shippers | 2 | 0 | 0 | " | " | " |
| Flettons | 1 | 5 | 6 | " | at railway depôt. | |
| Red Wire Cuts | 1 | 11 | 0 | " | " | " |
| Best Fareham Red | 3 | 12 | 0 | " | " | " |
| Best Red Pressed Ruabon Facing | 5 | 0 | 0 | " | " | " |
| Best Blue Pressed Staffordshire | 4 | 1 | 0 | " | " | " |
| Do. Bullnose | 4 | 6 | 6 | " | " | " |
| Best Stourbridge Fire Bricks | 3 | 15 | 6 | " | " | " |
| GLAZED BRICKS. | | | | | | |
| Best White and Ivory Glazed Stretchers | 12 | 0 | 0 | " | " | " |
| Headers | 11 | 0 | 0 | " | " | " |
| Quoins, Bullnose, and Flats | 16 | 0 | 0 | " | " | " |
| Double Stretchers | 19 | 0 | 0 | " | " | " |
| Double Headers | 16 | 0 | 0 | " | " | " |
| One Side and two Ends | 19 | 0 | 0 | " | " | " |
| Two Sides and one End | 20 | 0 | 0 | " | " | " |
| Splays, Chamferred, Squints | 20 | 0 | 0 | " | " | " |
| Best Dipped Salt Glazed Stretchers, and Header | 12 | 0 | 0 | " | " | " |
| Quoins, Bullnose, and Flats | 14 | 0 | 0 | " | " | " |
| Double Stretchers | 15 | 0 | 0 | " | " | " |
| Double Headers | 14 | 0 | 0 | " | " | " |
| One Side and two Ends | 15 | 0 | 0 | " | " | " |
| Two Sides and one End | 15 | 0 | 0 | " | " | " |
| Splays, Chamferred, Squints | 14 | 0 | 0 | " | " | " |
| Second Quality White and Dipped Salt Glazed | 2 | 0 | 0 | " | less than best. | |

| | s. | d. | |
|---|---|---|---|
| Thames and Pit Sand | 6 | 9 | per yard, delivered. |
| Thames Ballast | 5 | 3 | " " |
| Best Portland Cement | 26 | 0 | per ton, " |
| Best Ground Blue Lias Lime | 19 | 0 | " " |

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

### STONE.

| | s. | d. | |
|---|---|---|---|
| BATH STONE—delivered on road waggons, Paddington Depôt | 1 | 6½ | per ft. cube. |
| Do. do. delivered on road waggons, Nine Elms Depôt | 1 | 8½ | " " |
| PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 | 1 | " " |
| White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf | 2 | 2½ | " " |

| | s. | d. | |
|---|---|---|---|
| Ancaster in blocks | 1 | 10 | per ft. cube, deld. rly. depôt. |
| Beer " | 1 | 6 | " " |
| Greenshill " | 1 | 10 | " " |
| Darley Dale in blocks | 2 | 4 | " " |
| Red Corsehill " | 2 | 2 | " " |
| Closeburn Red Freestone | 2 | 0 | " " |
| Red Mansfield " | 2 | 4 | " " |

### STONE (continued).

| | s. | d. | | |
|---|---|---|---|---|
| YORK STONE—*Robin Hood Quality.* | | | | |
| Scappled random blocks. | 2 | 10 | per ft. | cube, deld. rly. depôt. |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 | 3 | per ft. super., | ,, |
| 6 in. rubbed two sides ditto, ditto | 2 | 6 | ,, | ,, |
| 3 in. sawn two sides slabs (random sizes) | 0 | 11½ | ,, | ,, |
| 2 in. to 2½ in. sawn one side slabs (random sizes) | 0 | 7½ | ,, | ,, |
| 1½ in. to 2 in. ditto, ditto | 0 | 6 | ,, | ,, |
| HARD YORK— | | | | |
| Scappled random blocks. | 3 | 0 | per ft. | cube, ,, |
| 6 in. sawn two sides landings to sizes (under 40 ft. super.) | 2 | 8 | per ft. super., | ,, |
| 6 in. rubbed two sides ditto | 3 | 0 | ,, | ,, |
| 3 in. sawn two sides slabs (random sizes) | 1 | 2 | ,, | ,, |
| 2 in. self-faced random flags | 0 | 5 | ,, | ,, |

| | s. | d. | |
|---|---|---|---|
| Hopton Wood (Hard Bed) in blocks | 2 | 0 | per ft. cube, deld. rly. depôt. |
| ,, ,, ,, 6 in. sawn both sides landings | 2 | 7 | per ft. super. deld. rly. depôt. |
| ,, ,, ,, 3 in. sawn both sides random slabs | 1 | 0 | ,, ,, |
| ,, ,, ,, 2 in. do. | 0 | 8½ | ,, ,, |

### SLATES.

| In. In. | £ | s. | d. | |
|---|---|---|---|---|
| 20×10 best blue Bangor | 13 | 2 | 6 | per 1000 of 1200 at r. d. |
| 20×12 ,, ,, | 13 | 17 | 6 | ,, ,, |
| 20×10 first quality ,, | 13 | 0 | 0 | ,, ,, |
| 20×12 ,, ,, | 13 | 15 | 0 | ,, ,, |
| 16×8 ,, ,, | 7 | 5 | 0 | ,, ,, |
| 20×10 best blue Portmadoc | 12 | 12 | 6 | ,, ,, |
| 16×8 ,, ,, | 6 | 12 | 6 | ,, ,, |
| 20×10 best Eureka unfading green | 15 | 17 | 6 | ,, ,, |
| 20×12 ,, ,, | 18 | 7 | 6 | ,, ,, |
| 18×10 ,, ,, | 13 | 5 | 0 | ,, ,, |
| 16×8 ,, ,, | 10 | 5 | 0 | ,, ,, |
| 20×10 permanent green | 11 | 12 | 6 | ,, ,, |
| 18×10 ,, ,, | 9 | 12 | 6 | ,, ,, |
| 16×8 ,, ,, | 6 | 12 | 6 | ,, ,, |

### TILES.

| | s. | d. | |
|---|---|---|---|
| Best plain red roofing tiles | 42 | 0 | per 1000 at rly. depôt. |
| Hip and Valley tiles | 3 | 7 | per doz. ,, |
| Best Broseley tiles | 50 | 0 | per 1000 ,, |
| Do. Ornamental tiles | 52 | 6 | ,, ,, |
| Hip and Valley tiles | 4 | 0 | per doz. ,, |
| Best Ruabon red, brown, or brindled do. (Edwards) | 57 | 6 | per 1000 ,, |
| Do. Ornamental do. | 60 | 0 | ,, ,, |
| Hip tiles | 4 | 0 | per doz. ,, |
| Valley tiles | 3 | 0 | ,, ,, |
| Best Red or Mottled Staffordshire do. (Peakes) | 51 | 9 | per 1000 ,, |
| Do. Ornamental do. | 54 | 6 | ,, ,, |
| Hip tiles | 4 | 1 | per doz. ,, |
| Valley tiles | 3 | 8 | ,, ,, |
| Best "Rosemary" brand plain tiles | 48 | 0 | per 1000 ,, |
| Best Ornamental tiles | 50 | 0 | ,, ,, |
| Hip tiles | 4 | 0 | per doz. ,, |
| Valley tiles | 3 | 8 | ,, ,, |
| Best "Hartshill" brand plain tiles, sand-faced | 50 | 0 | per 1000 ,, |
| Do. pressed | 47 | 6 | ,, ,, |
| Do. Ornamental do. | 50 | 0 | ,, ,, |
| Hip tiles | 4 | 0 | per doz. ,, |
| Valley tiles | 3 | 6 | ,, ,, |

### WOOD.

| BUILDING WOOD. | At per standard. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in. | 13 | 10 | 0 | ... | 15 | 0 | 0 |
| Deals: best 3 by 9 | 13 | 0 | 0 | ... | 14 | 0 | 0 |
| Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in. | 11 | 0 | 0 | ... | 12 | 0 | 0 |
| Battens: best 2½ by 6 and 3 by 6 | 0 | 10 | 0 | less than 7 in. and 8 in. | | | |
| Deals: seconds | 1 | 0 | 0 | less than best. | | | |
| Battens: seconds | 0 | 10 | 0 | ,, ,, | | | |
| 2 in. by 4 in. and 2 in. by 6 in. | 9 | 0 | 0 | ... | 10 | 0 | 0 |
| 2 in. by 4½ in. and 2 in. by 5 in. | 8 | 10 | 0 | ... | 9 | 10 | 0 |
| Foreign Sawn Boards— | | | | | | | |
| 1 in. and 1½ in. by 7 in. | 0 | 10 | 0 | more than battens. | | | |
| ¾ in. | 1 | 0 | 0 | ,, | | | |
| Fir timber: best middling Danzig or Memel (average specification) | At per load of 50 ft. 4 | 10 | 0 | ... | 5 | 0 | 0 |
| Seconds | 4 | 0 | 0 | ... | 4 | 10 | 0 |
| Small timber (8 in. to 10 in.) | 3 | 12 | 6 | ... | 3 | 15 | 0 |
| Small timber (6 in. to 8 in.) | 3 | 0 | 0 | ... | 3 | 10 | 0 |
| Swedish balks | 2 | 10 | 0 | ... | 3 | 0 | 0 |
| Pitch-pine timber (30 ft. average) | 3 | 5 | 0 | ... | 3 | 15 | 0 |
| JOINERS' WOOD. | At per standard. | | | | | | |
| White Sea: first yellow deals, 3 in. by 11 in. | 24 | 0 | 0 | ... | 25 | 0 | 0 |
| 3 in. by 9 in. | 22 | 0 | 0 | ... | 23 | 0 | 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 16 | 10 | 0 | ... | 18 | 0 | 0 |
| Second yellow deals, 3 in. by 11 in. | 18 | 10 | 0 | ... | 20 | 0 | 0 |
| ,, 3 in. by 9 in. | 17 | 10 | 0 | ... | 19 | 0 | 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 13 | 10 | 0 | ... | 14 | 10 | 0 |
| Third yellow deals, 3 in. by 11 in. and 9 in. | 13 | 10 | 0 | ... | 15 | 0 | 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 11 | 0 | 0 | ... | 12 | 0 | 0 |
| Petersburg: first yellow deals, 3 in. by 11 in. | 21 | 0 | 0 | ... | 22 | 10 | 0 |
| Do. 3 in. by 9 in. | 18 | 0 | 0 | ... | 19 | 10 | 0 |
| Battens | 13 | 10 | 0 | ... | 15 | 0 | 0 |
| Second yellow deals, 3 in. by 11 in. | 16 | 0 | 0 | ... | 17 | 0 | 0 |
| Do. 3 in. by 9 in. | 14 | 10 | 0 | ... | 16 | 0 | 0 |
| Battens | 11 | 0 | 0 | ... | 12 | 10 | 0 |
| Third yellow deals, 3 in. by 11 in. | 13 | 0 | 0 | ... | 14 | 0 | 0 |
| Do. 3 in. by 9 in. | 12 | 10 | 0 | ... | 14 | 0 | 0 |
| Battens | 10 | 0 | 0 | ... | 11 | 0 | 0 |

### WOOD (continued).

| JOINERS' WOOD (continued)— | At per standard. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| White Sea and Petersburg— | | | | | | | |
| First white deals, 3 in. by 11 in. | 14 | 10 | 0 | ... | 15 | 10 | 0 |
| ,, ,, 3 in. by 9 in. | 13 | 10 | 0 | ... | 14 | 10 | 0 |
| Battens | 11 | 0 | 0 | ... | 12 | 0 | 0 |
| Second white deals, 3 in. by 11 in. | 13 | 10 | 0 | ... | 14 | 10 | 0 |
| ,, ,, 3 in. by 9 in. | 12 | 10 | 0 | ... | 13 | 10 | 0 |
| ,, ,, battens | 10 | 0 | 0 | ... | 11 | 0 | 0 |
| Pitch-pine: deals | 16 | 10 | 0 | ... | 20 | 0 | 0 |
| Under 2 in. thick extra | 0 | 10 | 0 | ... | 1 | 0 | 0 |
| Yellow Pine—First, regular sizes | 44 | 0 | 0 | upwards. | | | |
| Oddments | 32 | 0 | 0 | ,, | | | |
| Seconds, regular sizes | 33 | 0 | 0 | ,, | | | |
| Yellow Pine oddments | 28 | 0 | 0 | ,, | | | |
| Kauri Pine—Planks, per ft. cube | 0 | 3 | 6 | ... | 0 | 5 | 0 |
| Danzig and Stettin Oak Logs— | | | | | | | |
| Large, per ft. cube | 0 | 3 | 0 | ... | 0 | 3 | 6 |
| Small ,, ,, | 0 | 2 | 6 | ... | 0 | 2 | 9 |
| Wainscot Oak Logs, per ft. cube | 0 | 5 | 0 | ... | 0 | 5 | 6 |
| Dry Wainscot Oak, per ft. sup. as inch | 0 | 0 | 8 | ... | 0 | 0 | 9 |
| ¾ in. do. do | 0 | 0 | 7 | ... | — | | |
| Dry Mahogany—Honduras, Tabasco, per ft. super. as inch | 0 | 0 | 9 | ... | 0 | 1 | 0 |
| Selected, Figury, per ft. super. as inch | 0 | 1 | 6 | ... | 0 | 2 | 6 |
| Dry Walnut, American, per ft. super. as inch | 0 | 0 | 10 | ... | 0 | 1 | 0 |
| Teak, per load | 17 | 0 | 0 | ... | 22 | 0 | 0 |
| American Whitewood Planks, per ft. cube | 0 | 4 | 0 | ... | 0 | 5 | 0 |
| Prepared Flooring, etc.— | Per square. | | | | | | |
| 1 in. by 7 in. yellow, planed and shot | 0 | 13 | 6 | ... | 0 | 17 | 6 |
| 1 in. by 7 in. yellow, planed and matched | 0 | 14 | 0 | ... | 0 | 18 | 0 |
| 1¼ in. by 7 in. yellow, planed and matched | 0 | 16 | 0 | ... | 1 | 0 | 0 |
| 1 in. by 7 in. white, planed and shot | 0 | 12 | 0 | ... | 0 | 14 | 6 |
| 1 in. by 7 in. white, planed and matched | 0 | 12 | 6 | ... | 0 | 15 | 0 |
| 1¼ in. by 7 in. white, planed and matched | 0 | 15 | 0 | ... | 0 | 16 | 6 |
| ¾ in. by 7 in. yellow, matched and beaded or V-jointed brds. | 0 | 11 | 0 | ... | 0 | 13 | 6 |
| 1 in. by 7 in. ,, ,, | 0 | 14 | 0 | ... | 0 | 18 | 0 |
| ¾ in. by 7 in. white ,, ,, | 0 | 10 | 0 | ... | 0 | 11 | 6 |
| 1 in. by 7 in. ,, ,, ,, | 0 | 12 | 9 | ... | 0 | 15 | 0 |

6 in. at 6d. to 9d. per square less than 7 in.

### JOISTS, GIRDERS, &c.

| | In London, or delivered Railway Vans, per ton. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Rolled Steel Joists, ordinary sections | 6 | 15 | 0 | ... | 7 | 10 | 0 |
| Compound Girders, ordinary sections | 8 | 5 | 0 | ... | 9 | 5 | 0 |
| Steel Compound Stanchions | 10 | 17 | 6 | ... | 11 | 7 | 6 |
| Angles, Tees, and Channels, ordinary sections | 8 | 5 | 0 | ... | 9 | 5 | 0 |
| Flitch Plates | 8 | 10 | 0 | ... | 9 | 0 | 0 |
| Cast Iron Columns and Stanchions including ordinary patterns | 7 | 0 | 0 | ... | 8 | 0 | 0 |

### METALS.

| | Per ton, in London. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| IRON— | | | | | | | |
| Common Bars | 8 | 0 | 0 | ... | 8 | 10 | 0 |
| Staffordshire Crown Bars, good merchant quality | 8 | 10 | 0 | ... | 9 | 0 | 0 |
| Staffordshire "Marked Bars" | 10 | 0 | 0 | ... | — | | |
| Mild Steel Bars | 8 | 15 | 0 | ... | 9 | 0 | 0 |
| Hoop Iron, basis price | 9 | 5 | 0 | ... | 9 | 10 | 0 |
| ,, ,, Galvanised | 17 | 0 | 0 | ... | — | | |
| (*And upwards, according to size and gauge.) | | | | | | | |
| Sheet Iron Black— | | | | | | | |
| Ordinary sizes to 20 g. | 9 | 10 | 0 | ... | — | | |
| ,, ,, 24 g. | 10 | 10 | 0 | ... | — | | |
| ,, ,, 26 g. | 12 | 0 | 0 | ... | — | | |
| Sheet Iron, Galvanised, flat, ordinary quality— | | | | | | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 14 | 0 | 0 | ... | — | | |
| Ordinary sizes to 22 g. and 24 g. | 14 | 10 | 0 | ... | — | | |
| ,, ,, 26 g. | 15 | 0 | 0 | ... | — | | |
| Sheet Iron, Galvanised, flat, best quality— | | | | | | | |
| Ordinary sizes to 20 g. | 17 | 0 | 0 | ... | — | | |
| ,, ,, 22 g. and 24 g. | 17 | 10 | 0 | ... | — | | |
| ,, ,, 26 g. | 19 | 0 | 0 | ... | — | | |
| Galvanised Corrugated Sheets— | | | | | | | |
| Ordinary sizes 6 ft. to 8 ft. 20 g. | 13 | 10 | 0 | ... | — | | |
| ,, ,, 22 g. and 24 g. | 14 | 0 | 0 | ... | — | | |
| ,, ,, 26 g. | 15 | 5 | 0 | ... | — | | |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker | 11 | 10 | 0 | ... | — | | |
| Best Soft Steel Sheets, 22 g. & 24 g. | 12 | 10 | 0 | ... | — | | |
| ,, ,, 26 g. | 14 | 15 | 0 | ... | — | | |
| Cut Nails, 3 in. to 6 in. | 9 | 10 | 0 | ... | 9 | 15 | 0 |
| (Under 3 in., usual trade extras.) | | | | | | | |

### LEAD, &c.

| | Per ton, in London. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| LEAD—Sheet, English, 3lb. and up. | 19 | 10 | 0 | ... | — | | |
| Pipe in coils | 20 | 0 | 0 | ... | — | | |
| Soil pipe | 22 | 10 | 0 | ... | — | | |
| Compo pipe | 22 | 10 | 0 | ... | — | | |
| ZINC—Sheet— | | | | | | | |
| Vieille Montagne ton | 33 | 10 | 0 | ... | — | | |
| Silesian | 33 | 10 | 0 | ... | — | | |
| COPPER— | | | | | | | |
| Strong Sheet per lb. | 0 | 1 | 0 | ... | — | | |
| Thin ,, ,, | 0 | 1 | 1 | ... | — | | |
| Copper nails ,, | 0 | 0 | 11 | ... | — | | |
| BRASS— | | | | | | | |
| Strong Sheet ,, | 0 | 0 | 11 | ... | — | | |
| Thin ,, ,, | 0 | 1 | 0 | ... | — | | |
| TIN—English Ingots ,, | 0 | 1 | 8 | ... | — | | |
| SOLDER—Plumbers' ,, | 0 | 0 | 8 | ... | — | | |
| Tinmen's ,, | 0 | 0 | 10 | ... | — | | |
| Blowpipe ,, | 0 | 0 | 11 | ... | — | | |

### ENGLISH SHEET GLASS IN CRATES.

| | | | |
|---|---|---|---|
| 15 oz. thirds | 2½d. | per ft. | delivered. |
| ,, fourths | 1½d. | ,, | ,, |
| 21 oz. thirds | 3d. | ,, | ,, |
| ,, fourths | 2½d. | ,, | ,, |
| 26 oz. thirds | 4d. | ,, | ,, |
| ,, fourths | 3½d. | ,, | ,, |
| 32 oz. thirds | 5½d. | ,, | ,, |
| ,, fourths | 5d. | ,, | ,, |

### ENGLISH SHEET GLASS IN CRATES (continued).

| | | | |
|---|---|---|---|
| Fluted Sheet, 15 oz. | 3½d. | per ft. | delivered. |
| ,, 21 oz. | 4d. | ,, | ,, |
| ½ Hartley's Rolled Plate | 2d. | ,, | ,, |
| ¼ ,, ,, ,, | 2½d. | ,, | ,, |
| ⅛ ,, ,, ,, | 2½d. | ,, | ,, |
| Figured and Oxford Rolled Oceanic, etc. white | 4d. | ,, | ,, |
| ,, ,, ,, tinted | 5½d. | ,, | ,, |

### OILS, &c.

| | | £ | s. | d. |
|---|---|---|---|---|
| Raw Linseed Oil in pipes | per gallon | 0 | 2 | 0 |
| ,, ,, ,, in barrels | ,, | 0 | 2 | 1 |
| ,, ,, ,, in drums | ,, | 0 | 2 | 3 |
| Boiled ,, ,, in pipes | ,, | 0 | 2 | 2 |
| ,, ,, ,, in barrels | ,, | 0 | 2 | 3 |
| ,, ,, ,, in drums | ,, | 0 | 2 | 5 |
| Turpentine in barrels | ,, | 0 | 4 | 2 |
| ,, in drums | ,, | 0 | 4 | 4 |
| Genuine Ground English White Lead | per ton | 22 | 10 | 0 |
| Red Lead, Dry | ,, | 21 | 10 | 0 |
| Best Linseed Oil Putty | per cwt. | 0 | 6 | 6 |
| Stockholm Tar | per barrel | 1 | 12 | 0 |

### VARNISHES, &c.

| | Per gallon. £ | s. | d. |
|---|---|---|---|
| Fine Pale Oak Varnish | 0 | 8 | 0 |
| Pale Copal Oak | 0 | 10 | 6 |
| Superfine Pale Elastic Oak | 0 | 12 | 6 |
| Fine Extra Hard Church Oak | 0 | 10 | 0 |
| Superfine Hard-drying Oak, for seats of Churches | 0 | 14 | |
| Fine Elastic Carriage | 0 | 12 | 6 |
| Superfine Pale Elastic Carriage | 0 | 16 | 0 |
| Fine Pale Maple | 0 | 16 | 0 |
| Finest Pale Durable Copal | 0 | 18 | 0 |
| Extra Pale French Oil | 1 | 1 | 0 |
| Eggshell Flatting Varnish | 0 | 18 | 0 |
| White Copal Enamel | 1 | 4 | 0 |
| Extra Pale Paper | 0 | 12 | 0 |
| Best Japan Gold Size | 0 | 10 | 6 |
| Best Black Japan | 0 | 16 | 0 |
| Oak and Mahogany Stain | 0 | 9 | 0 |
| Brunswick Black | 0 | 8 | 6 |
| Berlin Black | 0 | 16 | 0 |
| Knotting | 0 | 10 | 0 |
| French and Brush Polish | 0 | 10 | 0 |

## TO CORRESPONDENTS.

**NOTE.**—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

**BOLSOVER.**—For reconstructing sewage disposal works, for the Urban District Council. Mr. O. C. Furness, Engineer, Town End, Bolsover:—

| | | | |
|---|---|---|---|
| R. Shelley | £1,891 15 0 | Harris Bros. | £1,503 0 0 |
| H. Ashley | 1,677 11 7 | Egan & Sons | 1,496 14 9 |
| Beighton & Berry | 1,651 5 0 | R. Holmes & Sons, Chesterfield* | 1,480 11 7 |
| W. W. Bateman | 1,648 5 3 | D. Roberts | 1,463 10 10 |
| T. H. Harper | 1,587 7 6 | Cottle | 1,446 19 5 |
| J. Dean | 1,539 5 6 | Ward & Tetley | 1,301 13 0 |
| Bower Bros. | 1,512 1 5 | | |

**BRAINTREE.**—For secondary school. Messrs. Chancellor & Son, architects, 20, Finsbury-circus, London, and Chelmsford, Essex:—

| | | | |
|---|---|---|---|
| W. Manders | £10,244 15 9 | Mason & Son | £8,400 0 0 |
| J. Smith & Son | 8,985 0 0 | H. Potter & Son | 8,389 0 0 |
| F. Johnson | 8,934 0 0 | F. & R. Davey | 8,368 0 0 |
| J. Gowers | 8,930 0 0 | Everett & Son | 8,320 0 0 |
| Wall & Co. | 8,880 0 0 | Redding & Son | 8,300 0 0 |
| W. Parmenter | 8,863 0 0 | C. Roper | 8,275 0 0 |
| Coulson & Lofts | 8,859 0 0 | R. Elvy | 8,119 11 0 |
| A. Brown & Son | 8,831 0 0 | F. C. Thurman | 8,097 0 0 |
| W. H. Henkins | 8,627 0 0 | W. Roberts | 8,053 0 0 |
| F. Bennett | 8,525 0 0 | J. Barker & Co. | 8,015 0 0 |
| Grimwood & Sons | 8,523 0 0 | Parran & Son | 7,945 0 0 |
| | | J. McKay | 7,779 0 0 |

TENDERS—*Continued on page 77.*

# List of Contracts, etc.

## COMPETITION.

| Nature of Work. | By whom Required. | Premiums. | Designs to be delivered |
|---|---|---|---|
| *DESIGNS FOR FREE PUBLIC LIBRARY | Swadlincote U.D.C. | 25*l.*, 15*l.*, 10*l.* | Mar. 24 |

## CONTRACTS.

*(For some Contracts still open, but not included in this List, see previous issues.)*

| Nature of Work or Materials. | By whom Advertised. | Forms of Tender, etc., supplied by | Tenders to be delivered |
|---|---|---|---|
| Reconstruction of Cotton Shed, Werneth, Oldham | Lancashire and Yorkshire Ry. | Engineer's Office, Hunts Bank, Manchester | Jan. 23 |
| 780 yds. of Gas Main | Bolsover U.D.C. | W. G. H. Browne, Surveyor, Bolsover | do. |
| Nine Gas Lamps with Standards, etc. | do. | do. | do. |
| English Portland Cement | Derwent Valley Water Board | E. Sandeman, Engineer, Bamford, near Sheffield | do. |
| Sewering, Paving, etc., New Street | Belfast Improvement Comm. | City Surveyor's Office, Belfast | do. |
| *BOUNDARY WALL, NEASDEN | Willesden District Council | Council's Engineer, Dyne-road, Kilburn, N.W. | do. |
| Detached Villa at Lightcliffe | | R. Berry, Architect, Arcade-Cham., Commercial-st., Halifax | Jan. 24 |
| Villa, Storth Fields, Ainleys, Eland | Mr. A. Sharratt | H. Thompson, Architect, Post Office-chambers, Eland | do. |
| Strengthening Varley-street Bridge over Rochdale Canal | Manchester Corporation | City Surveyor's Office, Town Hall, Manchester | do. |
| Additions, etc., to Goods Warehouse, Middlesbrough | North-Eastern Railway Co. | W. Bell, Architect to Company, York | do. |
| Road, East Hampstead-road, Wokingham | Wokingham Investment Co. | Sec., 8, Shute-end, Wokingham | do. |
| 170,000 Jarrah Wood Blocks | Birkenhead Corporation | C. Brownridge, Borough Engineer, Town Hall, Birkenhead | do. |
| Electric Lighting of Two Sheds, Canon's Marsh | Bristol Docks Committee | W. W. Squire, Engineer, Cumberland-road, Bristol | Jan. 25 |
| Schools, Gladstone-road, Barry | Barry Education Authority | G. A. Birkenhead, Architect, 21, Park-avenue, Barry | do. |
| Extension of Edgehill Girls' College, Bideford | | J. Crocker, 98, Queen-street, Exeter | do. |
| Villa at Castleside, Durham | Mr. J. A. Ripley | J. J. Eltringham, Architect, Derwent-street, Blackhill | do. |
| Wiring, Fittings, etc., for Baths, Grove-lane, Handsworth | The U.D.C. | F. A. Nixon, Electrical Engineer, Soho-road, Handsworth | Jan. 26 |
| Wiring, Fittings, etc., Birchfield Branch Library | do. | do. | do. |
| Paving, Flagging, etc., of Gibson-street, Hull | Hull Corporation | A. E. White, City Engineer, Town Hall, Hull | do. |
| Walls Asphalting, etc., Hemington Schools, Radstock | The Managers | C. Benyon, Architect, Frome | Jan. 27 |
| Eight Dwelling-houses, Partridge-road, Llwynypia | | E. L. Parry, 80, Partridge-road, Llwynypia | do. |
| Porter's Lodge at Workhouse, Old Windsor | Windsor Guardians | Edgington & Summerbell, 7, Park-street, Windsor | do. |
| Wrought-iron, Steel, Nails, Screws, etc., Masham Scheme | Harrogate Corporation | E. W. Dixon, Engineer, 14, Albert-street Harrogate | do. |
| Alterations of Public Convenience, Bridgeton Cross | Glasgow Corporation | Office of Public Works, 64, Cochrane-street, Glasgow | do. |
| Granite and Slag | Hertfordshire County Council | N. A. Smith, County Surveyor, Hatfield | do. |
| Limestone and Team Labour | Llandaff, etc., R.D.C. | J. Holden, Surveyor, 20, Park-place, Cardiff | do. |
| Two Villas, Upper Marsh-road, Warminster | | A. F. Long, Architect, 53, Market-place, Warminster | do. |
| Ex. Sewage Disp. Wks., Salter Hebble (Contract 1, Brick Conduit) | Halifax Highways Committee | J. Lord, Borough Engineer, Town Hall, Halifax | Jan. 29 |
| Extension of Sewage Disposal Works (Contract 2, Pipes) | do. | do. | do. |
| Flags, Kerbs, Macadam, Pipes, etc. | Sale U.D.C. | W. Holt, Engineer, Council Offices, Sale | do. |
| Stores | Warrington Paving Committ | Borough Surveyor, Town Hall, Warrington | do. |
| Constructing St. Leonard's-avenue | Stafford Corporation | W. Blackshaw, Borough Engineer, Borough Hall, Stafford | do. |
| Municipal Buildings, Lower Shoreham-road | Southwick U.D.C. | G. Warr, Surveyor, Council Offices, Southwick | do. |
| Making-up Cromer-road, Romford | Romford U.D.C. | H. T. Ridge, Council Offices, Market-place, Romford | do. |
| Mortuary and Urinal, Portugal-place | Wallsend Corporation | G. Hollings, Borough Surveyor, Corporation Offices, Wallsend | do. |
| Branch Premises, Greenside | West Wylam, etc., Co-op. Soc. | Society's Offices, Prudhoe | do. |
| Extension of Tennis Pavilion, Dewsbury, etc., Cricket Ground | | C. H. Marriott, Son, & Shaw, Church-street-chbrs., Dewsbury | do. |
| Granite Paving Materials | Bootle Corporation | B. J. Wolfenden, Borough Engineer, Town Hall, Bootle | Jan. 30 |
| Reconstruction of Part of Nuneham Viaduct | Great Western Railway Co. | Engineer, Paddington Station, London | do. |
| 500 yds. of Egg-shaped Concrete Tubes | Epsom U.D.C. | E. R. Capon, Eng. & Sur., Bromley Hurst, Church-st., Epsom | do. |
| Railway into Riverbank Gas and Electricity Works | Kilmarnock Corporation | C. Fairweather, Engineer, Gas Office, Kilmarnock | do. |
| 760 tons of Cast-iron Pipes | Edinburgh, etc., Wa. Trustees | W. A. Tait, C.E., 72a, George-street, Edinburgh | do. |
| *COMPLETING CHESTERGATE COUNCIL SCHOOLS | Stockport Education Com. | Secretary to the Educa. Com., Education Offices, Stockport | do. |
| Pipe Sewer, Dean Park and Blinkbonny | Edin. Trinity Hospital Comm. | Burgh Engineer, Police-chambers Edinburgh | Jan. 31 |
| 375,000 Plastic Engineering Invert Bricks | Great Crosby U.D.C. | Watkin Hall, Surveyor, Council Offices, Great Crosby | do. |
| 80,000 Square Engineering Bricks | do. | do. | do. |
| 410,000 Semi-Plaster Engineering Invert Bricks | do. | do. | do. |
| Additions to Hospital, Merryflatts | Govan Parish Council | Thomson & Sandilands, Architects, 4, Jane-st., Blythswood-sq | do. |
| Water Supply Works, Nethy Bridge | | Mr. Gilbert, Engineer, The Square, Grantown, N.B. | do. |
| Granite and Iron Slag | Isle of Ely County Council | R. S. W. Perkins, County Surveyor, Southern Division, Ely | Feb. 1 |
| Streets, M'Donald-road, Edinburgh | George Heriot's Trust | Mr. Anderson, 20, York-place, Edinburgh | do. |
| Penwaun Council School, Repairs | Carmarthenshire Educ. Comm. | W. D. Jenkins, County Educ. Archt., Shire Hall, Carmarthen | Feb. 2 |
| Capel Evan Council School, Repairs | do. | do. | do. |
| Penygaer Council School, Repairs | do. | do. | do. |
| Saron Council School, Repairs | do. | do. | do. |
| Coedmore Council School, Ventilation and Repairs | do. | do. | do. |
| Glanamman Council School, Heating Apparatus | do. | do. | do. |
| *HEATING AND HOT-WATER WORKS, REIGATE WKHOUSE. | Reigate Union | Clerk to the Guardians, Reigate, Surrey | do. |
| Stores | Wallasey Works Committee | W. H. Travers, District Engineer, Public Offices, Egremont | Feb. 3 |
| Two Schools at Brinsworth | West Riding Education Com. | J. Vickers-Edwards, County Arch., County Hall, Wakefield | do. |
| School at Carforth | do. | do. | do. |
| School, Thrybergh | do. | do. | do. |
| Alterations, Moss and Fenwick School | do. | do. | do. |
| School, Wath-upon-Dearne | do. | do. | do. |
| Alterations, Darton Borough School | do. | do. | do. |
| Enlargement of Rawmarsh Ryecroft School | do. | do. | do. |
| Alterations, Reedness Provided School | do. | do. | do. |
| School Alterations, Austerfield | do. | do. | do. |
| Conveniences, Darton, Mappiewell School | do. | do. | do. |
| Asphalting, etc., Templenewsam, Colton School | do. | do. | do. |
| 175,000 Jarrah Wood Blocks | do. | do. | do. |
| Materials | Glasgow Corporation | Office of Public Works, 64, Cochrane-street, Glasgow | do. |
| Materials | Cheltenham Corporation | J. S. Pickering, Boro' Surveyor, Municipal Offices, Cheltenham | do. |
| Superstructure, New North Block, Glasgow Infirmary | Canterbury Rds. & Surv. Com. | A. C. Turley, City Surveyor, Guildhall-street, Canterbury | do. |
| Private Street Works | Managers | J. Miller, F.R.I.B.A., 15, Blythswoods-square, Glasgow | do. |
| Sewer Works | Southwick U.D.C. | G. W. Warr, Surveyor, Council Offices, Southwick | Feb. 5 |
| Chalk, Granite, Quartzite, and Flints | Prestwich U.D.C. | Office of Surveyor, Council Offices, Chester Bank, Prestwich | do. |
| *SUPPLY OF ROAD MATERIALS FOR ROYAL PARKS | Steyning West R.D.C. | E. Cripps, Council Offices, New Shoreham | do. |
| Private Street Works, Broad-street, etc. | Commrs. of H.M. Works, etc. | H.M. Office of Works, Storey's-gate, S.W. | do. |
| *ELECTRIC SUB-STATION, SALTLEY | Middleton Corporation | W. Welburn, Town Hall, Middleton | Feb. 6 |
| *ELECTRIC SUB-STATION, BORDESLEY | Birmingham Elec. Sup. Com. | Harris & Harris, 9, Bennett's-hill, Birmingham | do. |
| Surface-water Sewers, Hay Mills | do. | A. Rowse, King's Court, Colmore-row, Birmingham | do. |
| Foul-water Sewers, Hay Mills | Yardley R.D.C. | A. W. Smith, Engineer, Council House, Sparkhill, near Birm. | Feb. 7 |
| *ELECTRIC SUB-STATION, BALSALL HEATH | do. | do. | do. |
| Alterations, etc., to Haughley V. Schools, Stowmarket | Birmingham Elec. Sup. Com. | G. Kenwrick, 83, Colmore-row, Birmingham | do. |
| Sanitary Conveniences, Jubilee Park | Managers | H. G. Bishop, Architect, Bury-street, Stowmarket | Feb. 8 |
| Sewage-lifting Station, Pigeon House-road | Middleton Corporation | W. Welburn, Town Hall, Middleton | Feb. 9 |
| Impounding Reservoir | Dublin Corporation | G. Chatterton, Engineer, 6, The Sanctuary, Westminster | do. |
| Bretenham Voluntary School | Porthcawl U.D.C. | Taylor, Sons, & Santo Crimp, Eng., 27, Gt. George-st., Westm. | Feb. 12 |
| *ENLARGE. OF ORG. LOFT, ETC., AT GOLBORNE PARISH CH. | Managers | A. Ainsworth Hunt, Architect, Sudbury | do. |
| Warehouse, Harris-street, Bradford | Building Committee | Golborne Rectory, Newton-le-Willows | Feb. 13 |
| Alterations, etc., to Armathwaite Church School | Committee | P. Turner, Architect, 12, Midland-buildings, Bradford | No date. |
| Heating Four New Billiard Halls | Worcester Highways Comm | Oliver & Dodgshun, Architects, Carlisle | do. |
| Roadstone, Chippings, Slag | | A. C. Thomas, Waverley Mills, St. Simon-street, Salford | do. |
| House, Barnfield Estate, Exeter | | J. H. Garrett, County Road Surveyor, Shirehall, Worcester | do. |
| Sinking a Shaft at Chilton Colliery, near Ferryhill | | J. Archibald Lucas, A.R.I.B.A., Guildhall-chambers, Exeter | do. |
| *ALTERATIONS TO FACTORY PREMISES IN BERMONDSEY | Essex Education Committee | Manager of the Colliery | do. |
| *COMPLETION OF SCHOOL, LOUGHTON | | Purvis & Purvis, 14, Deptford-bridge, Deptford, S.E. | do. |
| | | Cubitt & Manchip, 2, Broad-street-buildings, E.C. | do. |

## AUCTION SALES.

| Nature and Place of Sale. | By whom Offered. | Date of Sale. |
|---|---|---|
| •DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C. | Churchill & Sim | Jan. 24 |
| •NURSERY STOCK, SOUTH WOODFORD—On the Premises | Protheroe & Morris | Jan. 29, 2 f.d. |
| •BUILDING SITES, GERRARD'S CROSS—At the Bull Hotel | Curtis & Henson | Jan. 30 |
| •FREEHOLD BUILDING SITE, CITY OF LONDON—At the Mart | Jones, Lang, & Co. | Feb. 19 |
| •BUILDING SITE, CITY OF LONDON—At the Mart | do. | do. |
| •CONTRACTOR'S PLANT AND MACHINERY—At Sunbury-road, Hanworth, Middlesex | Fuller, Horsey, Sons, & Cassell | Feb. 20 & f.d. |
| •BUILDING SITE, HAYMARKET, S.W. | May & Rowden | Mar. 29 |

• *Those with an asterisk are advertised in this number: Competition*, iv.; *Contracts*, iv. vi. viii. x.; *Public Appointments*, xvii.; *Auction Sales*, xix. xxviii.

### TENDERS.—*Continued from page 75.*

BRIDLINGTON.—For erecting a pavilion and café on the new extension of the Prince's Parade. Messrs. Mangnall & Littlewoods, architects, 42, Spring-gardens, Manchester:—

| | |
|---|---|
| Humphreys, Ltd. | £11,831 |
| Waring & White Building Co. | 11,321 |
| R. Blackett & Son | 10,780 |
| A. A. Booth | 10,630 |
| R. Bailey & Sons | 10,352 |
| Smallwood & Shaw | 10,221 |
| M. H. Fell | 10,177 |
| R. Neill & Sons | 10,100 |
| R. Lauder & Co. | 9,996 |
| J. H. Hudson | 9,810 |
| W. Gradwell & Co., Ltd. | 9,724 |
| Boulton & Paul, Ltd. | £9,497 |
| W. A. Peters & Sons | 9,486 |
| Wilson & Toft | 9,480 |
| G. Stoor & Son | 8,961 |
| J. R. Stork | 8,852 |
| T. Roper & Sons, Ltd. | 8,837 |
| T. Hannan & Son | 8,690 |
| T. Spink, Bridlington* | 8,750 |

CAERPHILLY.—For erecting 28 dwelling-houses at Pontygwindy-road, for the Ty Crwn Building Club. Mr. W. G. Young, architect, 28, Bartlett-street, Caerphilly:—

| | Per house. | | | | Per house. | | |
|---|---|---|---|---|---|---|---|
| Miles Bros. | £277 | 0 | 0 | F. Bristow | £215 | 0 | 0 |
| W. F. & L. Price | 249 | 0 | 0 | T. J. Wride | 212 | 0 | 0 |
| Riddiford & Huggins | 247 | 0 | 0 | M. Harding | 211 | 0 | 0 |
| F. D. Watkins & Co. | 235 | 0 | 0 | R. Jones | 209 | 10 | 0 |
| F. F. Howell | 230 | 0 | 0 | A. J. Rossiter, Caerphilly* | 205 | 0 | 0 |
| Madley & Perry | 230 | 0 | 0 | Jones & Cosslett | 204 | 17 | 6 |
| | | | | Hamilton & Millard | 203 | 10 | 0 |

CONSETT (Durham).—For street works, for the Urban District Council. Mr. W. S. Shell, Engineer and Surveyor, Parliament-street, Consett:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| J. T. Short | £296 | 17 | 3 | J. G. Bradley | £205 | 18 | 9 |
| T. C. Starkey | 280 | 9 | 1 | J. Moyle, Consett* | 200 | 0 | 0 |
| J. Allison | 214 | 8 | 0 | | | | |

[Surveyor's estimate, £215 8s. 1d.]

COOKHAM.—For the Aldwyn-road Council School, for the Berkshire Education Committee:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Holliday & Greenwood | £6,867 | 0 | 0 | J. Lovell | £5,973 | 0 | 0 |
| | 249 | 0 | 0 | | 281 | 0 | 0 |
| Jenkins & Sons, Ltd. | 6,780 | 0 | 0 | W. E. Theaker | 5,959 | 10 | 0 |
| | 277 | 0 | 0 | | 209 | 10 | 0 |
| Bosher & Son | 6,560 | 12 | 0 | A. Jackaman | 5,950 | 0 | 0 |
| | 272 | 10 | 3½ | | 228 | 0 | 0 |
| Crosby & Co. | 6,379 | 0 | 0 | Silver & Sons | 5,895 | 0 | 0 |
| | 270 | 0 | 0 | | 265 | 0 | 0 |
| John Barker & Co., Ltd. | 6,266 | 0 | 0 | W. Creed | 5,851 | 0 | 0 |
| | 254 | 0 | 0 | | 240 | 0 | 0 |
| F. Bissley | 6,135 | 0 | 0 | W. Watson | 5,796 | 0 | 0 |
| | 240 | 0 | 0 | | 246 | 0 | 0 |
| H. Flint | 6,116 | 7 | 9 | C. Cox & Son | 5,779 | 0 | 0 |
| | 316 | 0 | 0 | | 255 | 0 | 0 |
| Batten Bros. | 6,090 | 0 | 0 | G. H. Hughes | 5,748 | 0 | 0 |
| | 280 | 0 | 0 | | 247 | 0 | 0 |
| Marriot & Salter | 6,065 | 1 | 7 | A. Faulks | 5,695 | 0 | 0 |
| | 256 | 1 | 4 | | 240 | 0 | 0 |
| H. Harris | 6,040 | 7 | 9 | C. H. Hunt & Son | 5,673 | 0 | 0 |
| | 249 | 8 | 0 | | 270 | 0 | 0 |
| J. K. Cooper & Sons | 6,019 | 0 | 0 | H. D. Bowyer | 5,619 | 0 | 0 |
| | 242 | 0 | 0 | | 250 | 0 | 0 |
| C. Wells | 6,011 | 0 | 0 | G. H. Gibson, High Wycombe* | 5,520 | 0 | 0 |
| | 269 | 0 | 0 | | 268 | 0 | 0 |

COWPEN.—For making-up streets, for the Urban District Council. Mr. R. Grieves, Surveyor to the Council, Seaforth-street, Waterloo, Blyth:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Coxon & Sons | £1,185 | 3 | 6 | Jacob Robson, Newcastle-on-Tyne* | £793 | 6 | 6 |
| G. E. Simpson | 941 | 19 | 4 | | | | |

EAST PRESTON (Sussex).—For erecting a new infirmary and nurses' home at the workhouse, for the Guardians. Mr. H. M. Potter, architect, Christchurch-road, Worthing. Quantities by Mr. C. F. A. Poland, 6, John-street, Bedford-row, W.:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A. Crane | £8,108 | 11 | 8 | C. J. Drake | £7,250 | 0 | 0 |
| J. Longley & Co. | 7,798 | 0 | 0 | Rowland Bros. | 7,198 | 0 | 0 |
| A. Burrell | 7,673 | 0 | 0 | R. Cook & Son | 7,138 | 0 | 0 |
| J. H. Lelliott | 7,542 | 12 | 0 | Sandell & Sons | 7,000 | 0 | 0 |
| Linfield & Sons | 7,486 | 0 | 0 | T. J. Hawkins & Co. | 6,955 | 0 | 0 |
| Norman & Burt | 7,447 | 0 | 0 | W. Wallis, Littlehampton*‡ | 6,497 | 0 | 0 |
| H. M. Patrick | 7,379 | 0 | 0 | | | | |

‡ By arrangement reduced to £6,058 7s. 5d.

HENDON.—For road-widening works in Gutters Hedge-lane, and 12-in. sewer extensions, North End-road, for the Urban District Council of Hendon. Mr. S. Slater Grimley, Engineer and Surveyor:—

| — | Gutters Hedge-lane. | | | North End-road. | | | Totals. | | |
|---|---|---|---|---|---|---|---|---|---|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| T. Adams | 1,155 | 17 | 9 | 391 | 2 | 6 | 1,547 | 0 | 3 |
| G. C. Rayner | 1,207 | 1 | 3 | 325 | 0 | 0 | 1,532 | 1 | 3 |
| R. Ballard, Ltd. | 1,087 | 0 | 0 | 375 | 0 | 0 | 1,462 | 0 | 0 |
| J. Jackson | 1,064 | 11 | 0 | 328 | 15 | 0 | 1,393 | 6 | 0 |
| F. G. Brummell, 44, Sandringham-road, Willesden-green* | 1,001 | 2 | 7 | 358 | 6 | 9 | 1,359 | 9 | 4 |
| A. T. Catley | 1,040 | 0 | 0 | .. | | | 1,040 | 0 | 0 |

HOVE.—For new sewer in the western part of the Borough, for the Corporation. Mr. H. H. Scott, Borough Surveyor:—

J. Parsons & Sons, 176, Church-road, Hove* £11,357

LEYTON.—For the construction of the permanent way, for the Urban District Council Tramways. Mr. W. Dawson, Surveyor, Town Hall, Leyton:—

| | | | |
|---|---|---|---|
| G. Hay & Co. | £179,837 | 11 | 10 |
| R. C. Brebner & Co. | 172,531 | 14 | 0 |
| Smith & Co. | 168,794 | 10 | 10 |
| Playfair & Toole | 167,976 | 0 | 0 |
| G. Trentham | 166,657 | 13 | 10 |
| F. Osman | 165,947 | 17 | 4 |
| Smith & Co. | 159,186 | 6 | 0 |
| J. Ewart | 158,658 | 4 | 0 |
| W. Wise & Co. | 157,553 | 11 | 5 |
| T. Adams | 155,050 | 18 | 3 |
| A. Fasey & Co. | 154,823 | 4 | 1 |
| J. & W. S. Briscoe | 152,245 | 1 | 7 |
| Pethick Bros. | 151,170 | 5 | 9 |
| D. T. Jackson | 150,734 | 15 | 2 |
| G. Law | 148,676 | 14 | 6 |
| A. Krauss & Son | 146,704 | 0 | 0 |
| G. Wimpey & Co. | 146,173 | 11 | 1 |
| J. G. White & Co., Ltd. | 143,672 | 15 | 7 |
| D. Kerr & Co., Ltd. | 140,540 | 16 | 3 |
| R. W. Blackwell & Co., Ltd. | 138,862 | 3 | 0 |
| G. J. Anderson | 138,144 | 9 | 9 |
| British Electric Equipment Co., Ltd. | 137,612 | 16 | 7 |
| Underwood & Bros. | 135,163 | 9 | 5 |
| W. Griffiths & Co., Ltd. | 130,724 | 19 | 11 |
| T. C. Starkey | 128,445 | 13 | 9 |
| W. Manders, Leyton* | 127,485 | 10 | 5 |
| C. A. Zadig & Co.‡ | 115,866 | 8 | 0 |

‡ Withdrawn.

[Surveyor's estimate £136,520.]

LEYTON.—For private street works, for the Urban District Council. Mr. W. Dawson, Surveyor, Town Hall, Leyton:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| T. Adams | £3,397 | 17 | 7 | W. Griffiths & Co. | £2,937 | 2 | 9 |
| T. Free & Sons | 3,328 | 18 | 0 | O. T. Gibbons | 2,882 | 0 | 0 |
| Grounds & Newton | 3,255 | 4 | 11 | G. J. Anderson | 2,865 | 6 | 7 |
| Hewitt & Sons | 3,141 | 16 | 2 | W. Manders, Leyton* | 2,776 | 12 | 10 |
| J. Jackson | 3,057 | 7 | 4 | | | | |
| Waterhouse & Hanson | 2,956 | 0 | 0 | | | | |

LINCOLN.—For structural alterations at the City Sessions House, Lindum-road, for the Corporation. Mr. R. A. Macbrair, M.I.C.E., City Surveyor, Lincoln:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lincoln Co-op. Society | £522 | 14 | 5 | J. W. Giles | £450 | 0 | 0 |
| Halkes & Co. | 479 | 9 | 0 | A. Harrison | 427 | 0 | 0 |
| H. S. & M. Close | 456 | 9 | 7 | J. M. Harrison | 424 | 0 | 0 |
| B. Fanthorpe | 454 | 18 | 0 | W. Wright & Sons* | 420 | 0 | 0 |

LLANDILO.—For additions and alterations to Council School, for the Carmarthenshire Education Committee. Mr. W. D. Jenkins, County Education Architect, Shire Hall, Carmarthen:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Benjamin Howell & Son, Ltd. | £1,916 | 0 | 0 | Morris & Harris | £1,425 | 0 | 0 |
| D. Howells & Son | 1,768 | 5 | | W. Evans, Ammanford* | 1,395 | 0 | 0 |
| Thomas Bros. | 1,545 | 0 | | | | | |

LONDON.—For sewers and roads, Hill House Estate, Streatham Common. Mr. W. Newton-Dunn, architect, 1 and 2, Bucklersbury, E.C.:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Neave & Son | £3,941 | | | Trueman | £3,186 | | |
| Kavanagh & Co. | 3,669 | | | Marriott & Salter | 3,158 | | |
| A. Soan | 3,600 | | | Taylor | 2,976 | | |
| Hirst & Co. | 3,518 | | | Shelbourne & Co. | 2,975 | | |
| Peill & Sons | 3,400 | | | Pearce | 2,959 | | |
| Killingback & Co. | 3,355 | | | J. May | 2,656 | | |
| French | 3,320 | | | Gibbons | 2,642 | | |
| E. Iles | 3,292 | | | J. Jackson | 2,495 | | |

LONDON.—For sewers and roads, Galpin's Estate, Thornton Heath. Mr. W. Newton-Dunn, architect, 1 and 2, Bucklersbury, E.C.:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Hirst & Co. | £6,758 | 0 | 0 | Kavanagh & Co. | £4,198 | 0 | 0 |
| Shelbourne & Co. | 4,900 | 0 | 0 | Marriott & Salter | 4,177 | 17 | 7 |
| Killingback & Co. | 4,872 | 0 | 0 | French | 3,886 | 0 | 0 |
| Neave & Son | 4,552 | 0 | 0 | J. C. Trueman | 3,499 | 0 | 0 |
| A. Soan | 4,400 | 0 | 0 | E. Iles | 3,136 | 0 | 0 |
| Taylor | 4,336 | 0 | 0 | Pearce | 2,921 | 0 | 0 |
| Peill & Sons | 4,230 | 0 | 0 | J. Jackson | 2,695 | 0 | 0 |

LONGTON.—For sewage disposal works at Blurton Waste Farm, for the Town Council. Mr. J. W. Wardle, Borough Surveyor, Court House, Longton, Staffs:—

| | | | |
|---|---|---|---|
| H. E. Buckley | £14,001 | 18 | 10 |
| A. J. Cottle | 5,212 | 16 | 8 |
| W. Williams | 4,900 | 0 | 0 |
| P. Holloway | 4,900 | 0 | 0 |
| F. Mitchell & Son | 4,838 | 5 | 1 |
| F. Barke, Stoke-upon-Trent* | 4,832 | 10 | 0 |

MONMOUTH.—For sewer work, Hereford-road, for the Corporation. Mr. G. F. Grimwood, Engineer, Monmouth. Quantities by Engineer:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| J. Hatherby | £2,843 | 0 | 0 | R. W. Hunter & Co. | £1,176 | 13 | 1 |
| R. L. Friend | 1,700 | 0 | 0 | Barnes, Chaplin, & Co. | 1,098 | 5 | 4 |
| J. Edwards & Son | 1,537 | 0 | 0 | W. Westwood | 1,056 | 12 | 4 |
| Johnson Bros. | 1,535 | 0 | 0 | J. W. Thompson | 1,034 | 17 | 10 |
| C. H. Reed | 1,456 | 0 | 0 | R. W. Brebner & Co. | 1,028 | 4 | 0 |
| A. Williams | 1,415 | 9 | 7 | G. Rutter & Son | 980 | 0 | 0 |
| W. H. Gay | 1,393 | 0 | 0 | H. C. Parfitt, Newport* | 980 | 0 | 0 |
| R. Webb & Son | 1,315 | 6 | 9 | | | | |
| J. E. Evans | 1,300 | 0 | 0 | | | | |
| G. Jones | 1,254 | 0 | 0 | | | | |

WOODFORD.—For making-up private streets, for the Urban District Council. Mr. W. Farrington, Surveyor, Council Offices, Woodford Green:—

| — | Elmgrove. | | | Crescent-road. | | | Horn-lane. | | | Eagle-terrace. | | | Landscape-road. | | | Eastwood-road. | | | Wavertree-road. | | | The Shubberies. | | | Globe-road. | | | Gordon-road. | | | — | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| T. Adams | 83 | 15 | 3 | 532 | 8 | 7 | 631 | 7 | 0 | 541 | 7 | 2 | 243 | 14 | 0 | 2,077 | 12 | 1 | 548 | 4 | 5 | 705 | 3 | 0 | 305 | 13 | 3 | 211 | 12 | 0 | 5,880 | 16 | 9 |
| G. J. Anderson | 67 | 0 | 0 | 485 | 0 | 0 | 644 | 0 | 0 | 534 | 0 | 0 | 223 | 0 | 0 | 1,637 | 0 | 0 | 430 | 0 | 0 | 553 | 0 | 0 | 271 | 0 | 0 | 145 | 0 | 0 | 4,989 | 0 | 0 |
| G. Bell | 78 | 0 | 0 | 496 | 0 | 0 | 602 | 0 | 0 | 526 | 0 | 0 | 226 | 0 | 0 | 1,869 | 0 | 0 | 499 | 0 | 0 | 635 | 0 | 0 | 301 | 0 | 0 | 189 | 0 | 0 | 5,421 | 0 | 0 |
| J. E. Etheridge | 63 | 2 | 3 | 425 | 9 | 6 | 547 | 18 | 10 | 553 | 5 | 9 | 197 | 13 | 10 | 1,732 | 6 | 1 | 460 | 2 | 10 | 603 | 2 | 0 | 275 | 18 | 3 | 120 | 15 | 9 | 4,979 | 15 | 1 |
| Free & Sons | 77 | 3 | 9 | 464 | 1 | 7 | 556 | 4 | 5 | 488 | 7 | 1 | 180 | 6 | 2 | 1,800 | 14 | 10 | 483 | 3 | 6 | 625 | 5 | 5 | 290 | 18 | 3 | 159 | 4 | 6 | 5,134 | 9 | 6 |
| W. & C. French | 61 | 15 | 8 | 412 | 14 | 11 | 457 | 4 | 5 | 411 | 12 | 8 | 181 | 18 | 9 | 1,661 | 12 | 9 | 440 | 17 | 6 | 566 | 15 | 11 | 254 | 14 | 7 | 130 | 19 | 10 | 4,579 | 17 | 0 |
| A. Wisbey & Co. | 47 | 3 | 1 | 357 | 0 | 10 | 439 | 11 | 11 | 381 | 8 | 3 | 160 | 0 | 8 | 1,318 | 19 | 10 | 351 | 17 | 2 | 441 | 8 | 5 | 242 | 16 | 9 | 125 | 3 | 8 | 3,865 | 10 | 7 |
| Hewett & Sons | 62 | 1 | 6 | 402 | 1 | 10 | 471 | 18 | 0 | 410 | 16 | 2 | 168 | 16 | 0 | 1,322 | 14 | 8 | 470 | 1 | 0 | 603 | 14 | 0 | 259 | 17 | 7 | 106 | 17 | 3 | 4,278 | 8 | 0 |
| J. Jackson | 71 | 9 | 0 | 481 | 16 | 7 | 589 | 9 | 9 | 484 | 11 | 7 | 214 | 16 | 3 | 1,747 | 9 | 5 | 472 | 4 | 1 | 586 | 8 | 2 | 292 | 14 | 10 | 139 | 6 | 0 | 5,080 | 0 | 2 |
| W. Manders | 65 | 12 | 1 | 423 | 4 | 6 | 518 | 14 | 6 | 452 | 13 | 4 | 195 | 5 | 5 | 1,465 | 3 | 8 | 389 | 2 | 4 | 501 | 8 | 0 | 252 | 5 | 9 | 128 | 12 | 1 | 4,392 | 1 | 8 |
| Parsons & Parsons | 70 | 13 | 4 | 435 | 4 | 4 | 511 | 16 | 4 | 439 | 10 | 6 | 190 | 8 | 0 | 1,661 | 7 | 7 | 428 | 4 | 2 | 551 | 10 | 2 | 288 | 8 | 1 | 165 | 6 | 0 | 4,722 | 8 | 6 |
| F. C. Starkey | 66 | 8 | 1 | 393 | 19 | 4 | 501 | 9 | 5 | 406 | 11 | 3 | 189 | 16 | 0 | 1,491 | 11 | 11 | 396 | 14 | 0 | 517 | 14 | 9 | 240 | 18 | 7 | 106 | 5 | 6 | 4,311 | 8 | 10 |
| Waterhouse & Hanson | 68 | 15 | 8 | 458 | 17 | 8 | 596 | 2 | 4 | 486 | 4 | 5 | 221 | 4 | 6 | 1,636 | 1 | 8 | 449 | 9 | 6 | 574 | 10 | 8 | 275 | 19 | 6 | 140 | 15 | 0 | 4,908 | 1 | 0 |
| Wilkinson Bros. | 77 | 12 | 9 | 500 | 0 | 2 | 680 | 18 | 1 | 538 | 0 | 6 | 242 | 0 | 2 | 2,105 | 1 | 6 | 547 | 2 | 2 | 715 | 9 | 2 | 330 | 15 | 6 | 219 | 16 | 0 | 5,975 | 16 | 0 |
| Wilson, Border, & Co. | 65 | 15 | 2 | 458 | 18 | 5 | 581 | 15 | 10 | 489 | 10 | 5 | 190 | 5 | 2 | 1,845 | 1 | 10 | 445 | 12 | 9 | 743 | 16 | 3 | 317 | 14 | 6 | 139 | 8 | 9 | 5,277 | 19 | 1 |

NEWTON ABBOT.—For providing and fixing pens and lairs for cattle, and covered sheds, ticket-office, etc., for the Urban District Council. Mr. L. Stevens, Surveyor, Town Hall, Courtenay-street, Newton Abbot:—

| | | | |
|---|---|---|---|
| Andrews | £3,437 | F. A. Stacey | £2,425 |
| Coles | 3,265 | H. Parker, Newton Abbot* | 2,185 |
| F. Zealley | 2,493 | | |
| J. Stokes | 2,447 | | |

OSWALDTWISTLE.—For erecting hall and cottages, etc., Oswaldtwistle. Mr. G. Riley, architect:—

*Mason and Bricklayer, etc.*

| | | | |
|---|---|---|---|
| W. Parker | £1,082 0 0 | W. H. Bury & Son, White Ash-lane, Oswaldtwistle* | £847 15 0 |
| J. Riley | 1,074 2 8 | | |
| W. Broad & Sons | 992 8 6 | | |
| G. Cunliffe & Son | 919 5 0 | | |

*Joiner and Carpenter.*

| | | | |
|---|---|---|---|
| W. H. Dixon | £649 5 0 | J. Dichmont | £490 0 0 |
| G. Walsh & Sons | 525 0 0 | R. Duxbury | 475 0 0 |
| Pilkington Bros. | 520 0 0 | J. W. Harrison | 438 4 9 |
| S. Booth & Sons, Sadler-street, Church* | 498 0 0 | | |

*Plumber, Glazier, and Gasfitter.*

| | | | |
|---|---|---|---|
| N. Philpott | £199 5 11 | J. Lonsdale | £173 4 6 |
| M. Porter | 195 0 0 | R. T. Kenyon | 172 0 0 |
| J. R. Sudall, Union-road, Oswaldtwistle* | 178 0 0 | | |

*Slaterer.*

| | | | |
|---|---|---|---|
| Evans & Co. | £70 10 0 | T. Farnworth, Garden-street, Oswaldtwistle* | £70 5 0 |
| W. Green | 70 9 6 | | |

*Plasterer.*

| | | | |
|---|---|---|---|
| J. J. Wright | £145 0 0 | G. Eastwood, Horne-street, Accrington* | £108 9 3 |
| J. Barnes | 115 18 4 | | |

*Painting and Colouring.*

| | | | |
|---|---|---|---|
| S. Robinson | £55 0 0 | N. Philpott | £44 6 11 |
| Yates & Son | 52 0 0 | T. Pedder | 39 16 7 |
| J. Carter, Union-road, Oswaldtwistle* | 48 10 0 | | |

*Structural Engineer, Ranges, Tiles, and General Door and Window Furniture and Ventilation.*

J. W. Bridge, Accrington* ..... £369 7 4

REDDITCH.—For 4,417 yds. of stoneware pipe sewer, for the Urban District Council. Mr. B. Perrins, Surveyor, Council House, Redditch:—

| | | | |
|---|---|---|---|
| Tilt Bros. | £7,264 3 0 | A. E. Palmer | £3,945 0 0 |
| J. White, jun. | 6,581 7 6 | J. Riley | 3,733 4 9 |
| Sutherland & Thorpe | 4,382 13 4 | E. Boore | 3,605 13 11 |
| | | G. Rutter | 3,527 19 1 |
| Currall, Lewis, & Martin, Ltd. | 4,263 0 0 | J. Holme & Sons | 3,442 9 0 |
| J. Owens | 4,262 0 0 | T. J. Mason | 3,409 8 10 |
| J. A. Meredith | 4,213 0 0 | Smedley & Booth, Leicester* | 3,248 17 5 |
| F. Osenton | 4,185 0 0 | | |
| Hewett & Sons, Ltd. | 4,005 0 0 | | |

RUGBY.—For Rugby Station sorting-office enlargement:—

| | | Credit. |
|---|---|---|
| Walton & Son | £1,076 0 0 | £20 0 0 |
| A. J. Chown | 990 0 0 | 25 0 0 |
| R. Cleaver | 980 0 0 | 25 0 0 |
| J. Holloweil | 974 0 0 | — |
| Macksley Bros. | 902 4 6 | 11 12 6 |
| R. P. Gathercole | 823 10 6 | 14 3 6 |
| Hopkins & Son* | 822 6 0 | 15 16 0 |

SUTTON.—New infants' Council school, for Surrey Education Committee. Messrs. A Wickham Jarvis and Frank A. Richards, M.A., Architects to the Surrey Education Committee, 36, Victoria-street, London, S.W.:—

| | | | |
|---|---|---|---|
| Mitchell Bros. | £5,000 | J. B. Potter | £4,488 |
| J. J. Pink | 4,987 | J. & M. Patrick | 4,458 |
| Crosby & Co. | 4,916 | G. Kemp | 4,432 |
| R. J. Humphris | 4,852 | F. J. Shopland | 4,223 |
| R. Wood & Son | 4,817 | Hawkins & Co. | 4,121 |
| Martin Wells & Co. | 4,565 | R. Jones & Son | 3,990 |
| Drowley & Co. | 4,511 | | |

TEIGNMOUTH.—For making-up Upper Ferndale-road, for the Urban District Council. Mr. C. F. Gettings, Surveyor and Water Engineer, Town Hall, Teignmouth:—

| | | | |
|---|---|---|---|
| Hawking & Best | £673 | E. Harris, Clyst Hydon, near Exeter* | £625 |
| S. J. Hayman | 650 | | |

TWICKENHAM.—For erecting a free library, for the Urban District Council Free Library Committee. Mr. H. Goadby, architect and surveyor, Bank-chambers, Twickenham:—

| | | | |
|---|---|---|---|
| Prestige & Co. | £5,946 0 0 | W. Lawrence & Son | £5,274 0 0 |
| T. Bendon | 5,843 0 0 | Wisdom Bros. | 5,250 0 0 |
| W. Gibson & Co. | 5,804 0 0 | J. & C. Bowyer | 5,237 0 0 |
| J. W. Brooking | 5,650 0 0 | Vigor & Co. | 5,197 0 0 |
| T. Almond & Son, Ltd. | 5,636 0 0 | W. J. Fryer & Co. | 5,150 0 0 |
| J. Cassee | 5,596 0 0 | L. F. Lamplough | 5,149 0 0 |
| J. Minter | 5,471 0 0 | W. J. Dickens | 5,143 0 0 |
| M. Wells & Co., Ltd. | 5,465 0 0 | W. & B. H. Davey | 5,127 10 10 |
| S. E. Moss & Co. | 5,400 0 0 | J. Barker & Co., Ltd. | 5,126 0 0 |
| W. J. Renshaw | 5,395 0 0 | H. Lovatt, Ltd. | 5,100 0 0 |
| Myall & Upson | 5,315 0 0 | F. & G. Foster | 5,077 0 0 |
| S. N. Soole & Son | 5,300 0 0 | W. Taylor & Co. | 5,074 0 0 |
| Spencer, Santo, & Co., Ltd. | 5,300 0 0 | E. F. McCarthy | 4,987 0 0 |
| W. H. Hyde | 5,294 0 0 | J. Christie | 4,977 0 0 |
| Speechley & Smith | 5,280 0 0 | F. & E. Davey, Ltd. | 4,973 0 0 |
| Eldridge & Son | 5,278 0 0 | Cowley & Drake | 4,873 0 0 |
| | | H. Kent | 4,850 0 0 |
| | | B. E. Nightingale* | 4,832 0 0 |

WESTON-SUPER-MARE.—For alterations to premises in High-street, for Messrs. George. Messrs. Hans Price & W. Jane, architects, Weston-super-Mare:—

| | | | |
|---|---|---|---|
| G. & J. E. Stokes | £609 0 | C. & E. Stradling, Weston-super-Mare* | £446 12 |
| C. Addicott | 590 10 | | |
| G. Sprake | 450 0 | | |

WHITLEY.—For private street improvement works, for Whitley and Monkseaton Urban District Council. Mr. J. P. Spencer, architect and surveyor, 30, Howard-street, North Shields:—

W. Gray, Whitley Bay,* schedule of prices.

WITLEY (Surrey).—For the erection of a farmhouse on Witley Park Estate, for the Right Hon. Lord Derby. Mr. John H. Howard, architect, Haslemere:—

| | | | |
|---|---|---|---|
| Chapman & Lowry, Ltd. | £1,617 0 | D. Fry | £1,498 10 |
| F. Milton | 1,529 0 | E. Enticknap & Sons, Milford† | 1,313 0 |

YSTRADGYNLAIS.—For erecting a new chapel, for the Trustees of Ynys Calvinistic Methodist Church. Messrs. W. Jones & W. D. Morgan, architects, Victoria-chambers, Pentre, Rhondda:—

E. Thomas & Son, Seven Sisters, Neath.. £1,923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